SEP 26 1944

TELEPHONE ENGINEER and Management

THE NATIONAL TELEPHONE MAGAZINE

SEPTEMBER, 1944

featuring –

BUDGETING FOR THE SMALL EXCHANGE

By

CARL D. BROREIN

President & General Manager
Peninsular Telephone Company
Tampa, Florida

•

EDITORIAL INDEX—Page 13

•

THE COVER PICTURE

Somewhere in the Marshall Islands—The lineman's job is simplified by the use of coconut palm poles.

Pictured are, left to right: Sgt. Ray J. Schultis, of 4212 W. 48th St., a Federal Reserve Bank employee in civilian life, and Corp. William H. Ritson, 24, son of Mr. and Mrs. James H. Ritson, of 8408 Garfield Heights Boulevard, an upholsterer prior to his enlistment, both of Cleveland, Ohio.

Official Marine Corps Photo.

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LEICH

BUILDS THIS LITTLE REPEATING CO

MANUFACTURERS

We too have completed our plans for the coming national convention of the United States Independent Telephone Association. Our October Fortnightly will be the Pre-Convention Number and our October TELEPHONE ENGINEER & MANAGEMENT will bring you the complete Convention Report. Our report will contain important papers and pictures of this important meeting and will come to you immediately following the sessions. We are devoting the entire Report Number to the USITA.

▲

The sad news of the sudden death of M. E. (Marty) Bellion reached us just when this issue was on the press. He was for many years the Supply Sales Manager of the Kellogg Switchboard & Supply Company. Marty was well known and liked by our industry having spent most of his business life serving Independent telephone people. We have lost a friend.

▲

Because of our USITA Convention Report the Short Course will be continued in our November issue. The concluding chapter started in this issue and final questions will appear in the last section. We have made many friends during our Training Courses and have enjoyed serving each of them as our contribution to the art.

R. W. S.

TELEPHONE ENGINEER AND MANAGEMENT

VOL. 48, No. 9 SEPTEMBER, 1944

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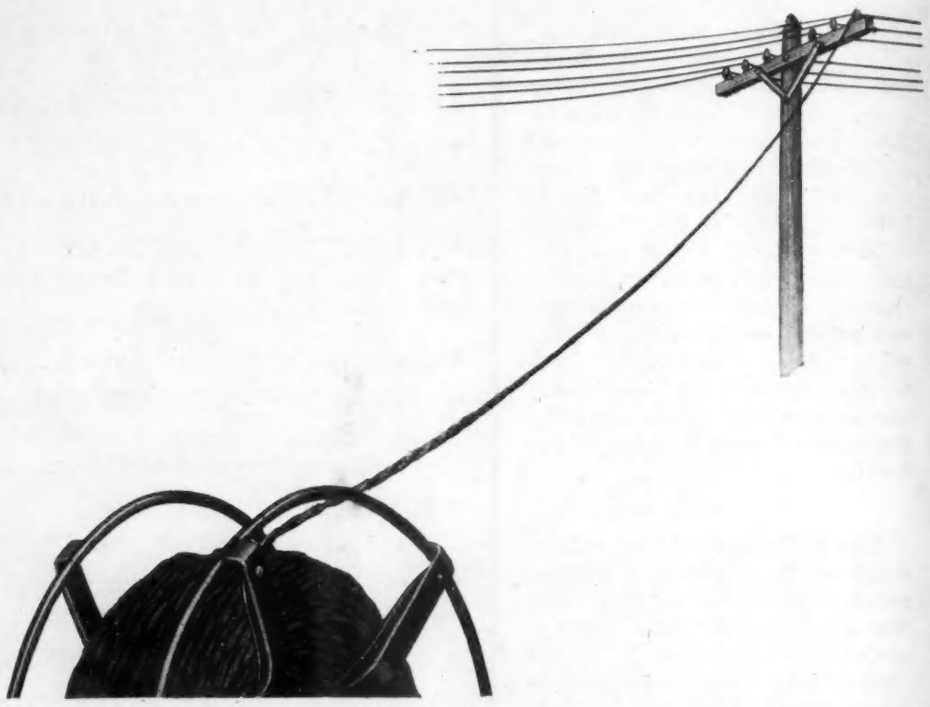
Right Off the Reel



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25 YEARS AGO THIS MONTH

Taken from TELEPHONE ENGINEER files of August, 1919.

The Delphos, Ohio, Home Telephone Company installed a unique system for reporting fires in the town, according to September, 1919, TELEPHONE ENGINEER. The company asked the residents of the city to familiarize themselves with the improved fire warning method so that best and quickest results would be obtained. The improvement involved the running of special lines from the telephone exchange to the city building, water works station and to the electric light plant, all three lines were operated with one plug and correctly placed calls would reach all three places at the same time.

★

During the race riots and street car strikes in Chicago, the Chicago Telephone Company obtained hotel rooms for those of its employees who found it necessary to remain in the loop. In addition to this, says September, 1919, TELEPHONE ENGINEER, employees who were not working were entertained by the company at the Majestic theater in Chicago.

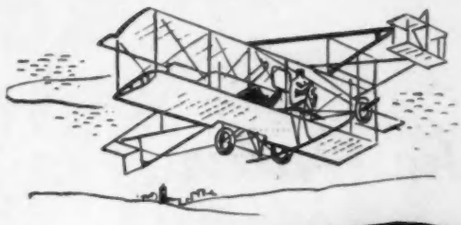
★

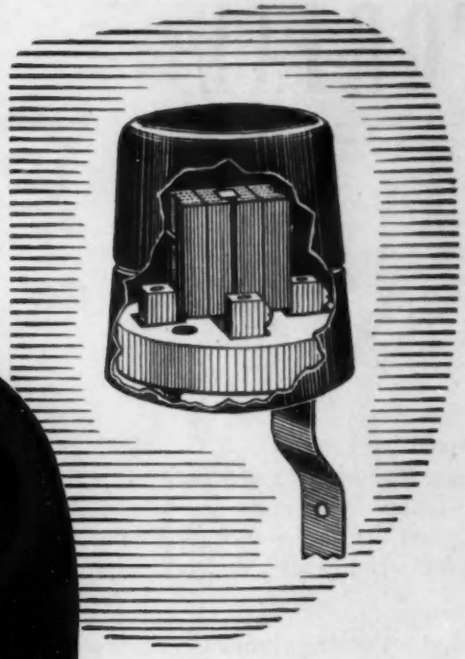
Relations between company and employees were given the attention of employees of Southern Bell Telephone Co., representing nine states when, after a three weeks' convention, an organization was set up to serve as an intermediary between the 16,000 workers which the group represented, and the firm itself.

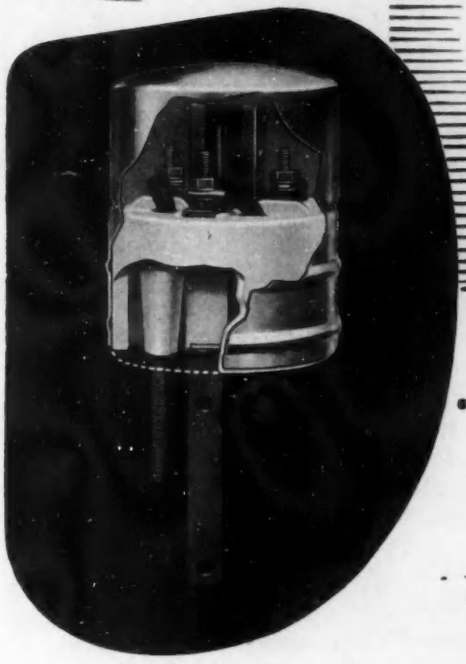
The purposes of the organization as specified in its constitution, which was quoted in September, 1919, TELEPHONE ENGINEER, were to bring about closer understanding between workers in all departments and the company employing them, so that both might benefit. Said the constitution, "the association believes that the interests of the management and the employees are common and not opposed," and proceeding on that basis, they expected to develop efficiency and a spirit of cooperation.

★

35 YEARS AGO..







.. AND TODAY

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OVER 35 YEARS SERVICE TO THE TELEPHONE INDUSTRY

EDITORIAL

Figures on the Future

In our exclusive Executive Article this month, Mr. Carl D. Brorein, President and General Manager of the Peninsular Telephone Company, writes on the importance of budgeting by small telephone companies, and tells how to do it.

Undoubtedly the managements of some small telephone companies have the impression that the preparation of a budget, annually in advance, is of no particular use in the operation of the small business. Undoubtedly, too, some managements have the impression that an annual budget, even though it may be of help in operation, is a task too difficult and too complicated to be undertaken by the small company.

We think that both these impressions are wrong. We also think that a properly prepared budget may in many cases be more valuable to a small company than to a large company. The relatively limited resources of the small company need to be watched and dealt with even more carefully than those of the larger company, which usually has resources and reserves sufficient to protect it from financial difficulties should it, for any reason, have to deal with a situation against which it had not planned.

Most large companies make budgets for a coming year as a matter of course.

The preparation of a budget necessitates a kind of co-ordination between the different departments of the business that is a good thing for any business. It requires thought and planning by the plant superintendent as to the expenditures he feels he must make on or for plant during the budget period; study by the traffic superintendent on his operating plans; consideration by the commercial manager on expected gain or loss of stations, increase or decrease of toll business, and other prospective changes in revenues.

It requires consideration by the general manager as to the amount of money the company can afford to spend or invest during the budget period, and by the principal financial officer or the president as to the best method of raising the money that must be had from the outside for capital expenditures.

When the budget has been completed, it represents the prognostications, ideas and plans of the head of every department of the business, and when approved by the management it charts a course for every department to follow during the year to come.

For the small company, budgeting is much simpler, but in our opinion it is just as important; perhaps, as we have said, even more important than it is to the larger company.

Budgeting, after all, is simply the proposition of making plans based on the best possible forecast as to the near future, and setting them down on paper and using that paper as the general course to be followed by the business for the budget period unless it is upset by unforeseen events. It is an excellent safeguard against dangerous deviations from the course the business should follow.

It is said that "hindsight is better than foresight", but in our opinion foresight is an extremely important factor in the management of a business. The making of a budget compels the management to use foresight.

We hope that Mr. Brorein's exposition of budget making for small telephone companies will induce many such companies to prepare budgets from now on.

By CARL D. BROREIN
President & General Manager
Peninsular Telephone Company
Tampa, Florida

BUDGETING FOR THE SMALL EXCHANGE

THE Telephone Industry is concerned about the situation confronting the small Independent telephone property. It is not always easy to get those outside the Industry to understand the peculiarities of the small exchange operation—the manner in which these exchanges have been built and operated as a family enterprise, because only by long hours and constant attention with a final profit coming after years of development could a small exchange exist—the difficulties of the small exchange operator in making adequate showing before regulatory bodies—the effect of standardized wage and hour provision on these small town operations. Let it suffice to mention these three major problems of the small exchange; there are many others. The purpose of this article, however, is not to enumerate the problems or paint a path of trial and tribulation. The Industry is aware of the situation and in the course of time will be able to secure an understanding on the part of the public and regulatory bodies that will insure a continuation of the small Independent company.

The development of telephone communication by the small company in the thousands of communities and rural areas that would otherwise have been passed, is proof of their economic worth. They have served a definite purpose in the expansive development of the communications system of this Nation; they deserve consideration. The subject of this article, however, indicates a means by which the small company, as well as the larger company, may benefit itself through greater operating efficiency.

It is difficult to state how widespread budget making in the telephone industry is at present. It is not very difficult to point out, however, the advantages that can be gained by this practice and the manner in which it can be accomplished with reasonable simplicity and ease. The making of budgets originated in Government. No doubt, however, the principle was practiced in private industry long before a name was applied to the practice. Budget making and budget control have become common terms. Even though for advertising purposes, convenient budget making forms are furnished to families for a so-called family budget, I venture to state that very little use has been made of them and that to a large extent for a great many of us, a budget is still a matter of conversation only. Perhaps the simplest way to approach this subject, for our purpose, is to define a budget. It is an **"estimate of revenue and expenditures for the ensuing fiscal period and the operating result incident thereto."**

THe "ensuing fiscal period" in the Telephone Industry means the calendar year for in most, if not all cases, the "fiscal year" of our Industry is the calendar year. The making of a budget therefore contemplates that an estimate of the results of the year ahead of us be made; that is, during December or the latter part of the year 1944, for example, we make up an estimated balance sheet and operating statement as of December 31, 1945, a year in advance of the actual operation, based upon our plans for the coming year and our knowledge of what can reasonably be expected.

CARL D. BROREIN, President & General Manager
Peninsular Telephone Company, Tampa, Fla.

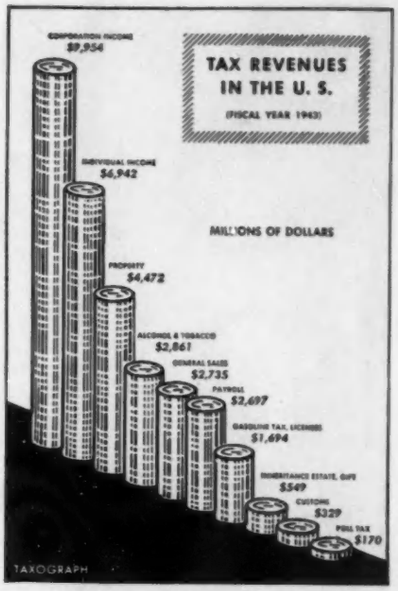
The Author of our Red Seal exclusive article on budgeting for the smaller company is, in our opinion, "tops" on a subject of this nature. Mr. Brorein is also a past president of the United States Telephone Association and is now serving as Special Advisor to the Communications Branch of the War Production Board. We proudly present his article written exclusively for TELEPHONE ENGINEER & MANAGEMENT. **Reproduction rights reserved unless written permission is granted.**

While such a budget, forecasting the results of the years operation, would be helpful in providing a general plan to work to and fixing our thought and our endeavors toward the accomplishment of this plan, the real purpose of budget control can much more effectively be accomplished by the breaking down of our estimates into at least quarterly and preferably monthly segments, so that each quarter or each month we will have an opportunity to check our actual operating results with our estimates for the period involved, the total of which provides our budget for the year.

In order to make this procedure reasonably simple, let us go through, step by step, the actual preparation of a budget. The basic item in our consideration is that of revenue; the unit which provides our major revenue is the station in service. Therefore, we begin our budget preparation with a statement of station movement in and out, made up for each month, showing the net gain or loss of stations and the total number of stations in service for each month of the year under consideration. In many areas of the country there is a seasonal movement of stations in and out; such a statement, therefore, of estimated station movement, will cause us to analyze our removal and installation possibilities and tabulate the monthly results.

This particular statement may enable us to set goals for "installation sales" and will provide us with a monthly opportunity to check our station movement and attempt to off-set undue losses with renewed effort for new installations. If new installations cannot be secured, we will then find a monthly opportunity to off-set such station losses with reduction in expense items, thereby enabling us to minimize, in our financial operations for the year, the effect of such losses. We can easily determine the local exchange revenue and the toll revenue provided by the average station in service in our particular property, from the experience of previous years.

The application of this average per station revenue, both local and toll, to the stations in service on our monthly or quarterly station estimate, will then provide the revenue items for the same period for our operating estimate. We have found in our experience that the average station revenue and the average toll revenue per station are fairly consistent items and may be applied with reasonable accuracy for estimate purposes. However, if it is desired for greater accuracy, the stations gained or lost may be classified and the actual exchange rate for the classification, used in determining the revenue item; and by the same token the average toll produced by this particular classification of station may also be determined and used.



While these two items produce the major part of the revenue in our Industry, there are still other items of revenue, all of which should be estimated and included. Miscellaneous revenues derived from leases or rental for special plant facilities or special services, rents from property, rents from attachments or leased wires, directory advertising, etc., are all items of revenue that have a place in the budget. No fixed pattern can be determined for these items as their nature and number vary too greatly with each company. However, based on previous operation and the conditions confronting the particular situation these items can be estimated and their gain or loss reflected in the budget. By this process and the application of thought and energy to the particular item, it may become apparent that further effort to expand revenue from these particular items is practical and proper.

WE now have an estimate of the revenue for the ensuing year established; in support of it, we have the monthly station movement and net gain or loss and the estimated monthly revenues provided for the purpose of obtaining a monthly check against actual operation. Let us turn, then, to the items of expense. To an extent, these are fairly well fixed in the smaller plants, so there is little room for payroll variation and little expenditure of money that is not needed to maintain and operate the Telephone System.

On the other hand, if we are to operate either at a profit, or at a loss, we should know it while it is occurring. An estimate of the expenses for the ensuing year is suggested to be made in this manner. Previous years payroll is available; it represents the largest item of expenditure; it should be estimated for the coming year by adjustment either up-ward or down-ward, in accordance with our known work requirements, by the number of employees we must add or subtract to meet these requirements and the wage rates which we will be required to pay.

If our labor requirements are stable throughout the year this item can be distributed equally to our twelve monthly estimates; or if, with a company of several employees, work is of a seasonal nature with lay off and reduced employment during the year, this item may be distributed to the monthly statement on the basis of conditions as we know them. Maintenance materials and supplies may be estimated and distributed in the same manner. Taxes may be included on the basis of the previous year, or altered to meet known conditions.

Depreciation, while a fixed charge, will vary with the amount and type of plant installed and should be included in accordance with this variation; or it may be, for the sake of simplicity, that the amount actually used for the previous year could be used for the ensuing year as the difference will not be great. Interest, of course, is a fixed charge and should be calculated on the amount of debt you will have outstanding and the interest rate paid on it.

Any other reserves which are included in your operation, such as Storm Reserve, Insurance Reserve, etc., should be handled in like manner. Taxes, Depreciation, Interest and other reserve accounts are all fixed charges to a large extent and in the estimate could be varied only to meet any conditions which we know will be changed for the ensuing year. In this connection, plant and equipment depreciation is a vital part of our operation; unless we meet it by the adoption of a plan which is considered fairly adequate to make replacement of plant units as their life expires or obsolescence occurs, we will find ourselves sooner or later operating a worn out plant incapable of rendering a satisfactory service.

THERE may be other items that enter into your particular budget; the essential and substantial ones are enumerated above. If you have others, they should be included on the basis of your experience and your knowledge of anticipated conditions. With the inclusion of these items, we are now ready

to strike a total and arrive at our estimated operating statement for the close of the ensuing year, backed up by monthly or quarterly auxiliary statements which, while not essential to make a budget, are essential to enable the operator to make comparison between his estimate and actual operation as the year progresses and to balance his operations accordingly. In other words, if it is found that revenues are dropping off greater than estimated by the end of any quarter, or at any monthly period, an effort can be made to offset or balance this loss by reduced expenditures.

If, on the other hand, revenues are greater, it may be found desirable to expend some additional money in maintenance material or maintenance payroll. It may even be found possible to take operating profits for needed plant extension, adding thereby to the capital investment for the purpose of securing new business, and added revenues. With the estimated operating statement for the end of the year completed, your operating profits or losses and the reserve credits can be transferred to a balance sheet projected a year ahead and reflecting the operating results estimated in the budget.

JUST a word with reference to the tax item refered to above. It is fairly easy to determine your Local and State Taxes. The Federal tax item varies with the amount of your estimated profit. Therefore, if your profit increases above your estimate this item may substantially increase and vice versa. Again for the purpose of simplicity and to avoid too many complications in your first budget experience it may be best to take the previous years Federal Tax as your estimate for the coming year and be concerned with the adjustment of this item during the year when you find your profits or your losses above or below the previous year are becoming apparent and a definite calculation based on actual results can be made.

In addition, it is well to set up a proposed construction program for the year, so that you will know what material and equipment you expect to purchase, when and in what quantity it should be purchased, the cost of the labor required to place it in service and the approximate time when the payment of the bills involved will need to be made. With such a tangible plan before you, selection can be made for the use of material and payroll in construction that will be most advantageous and profitable to the company at a time when existing employees might best be diverted from operating and maintenance to construction, thereby decreasing the operating and maintenance costs and utilizing these costs to best advantage in added capital investment.

Convention Dates

United States Independent Telephone Association, Stevens Hotel, Chicago, October 10, 11 and 12.

South Dakota Telephone Association, Hotel Widman, Mitchell, October 19.

Virginia Telephone Association, Hotel Roanoke, Roanoke, October 26 and 27.

North Carolina Telephone Association, Hotel Pine Needles, Southern Pines, November 13 and 14.

Alabama Telephone Association, Hotel Jefferson Davis, Montgomery, November 13 and 14.

Missouri Telephone Association, Hotel Muehlebach, Kansas City, November 21 and 22.

In many areas seasonal weather conditions as well as seasonal business conditions, will permit the planning of construction in this manner to the best advantage. The preparation of such an estimate is quite simple; the scope of the proposed construction, the man hours of labor required, the cost of the materials involved and the overhead or supervision in preparation and execution of the plan, are all included.

Theoretically, and as a matter of fact practically, the inclusion of the labor and overhead from existing personnel will serve to reduce the operating cost for the period and place your expenditures for this purpose as added capital investment. It is possible, therefore, to not only plan the construction program so that the most advantageous results can be accomplished, but also, in doing this, to assure ourselves that the proper weight is given to the added investment.

The additions and subtractions from plant contemplated in these estimates, as well as the charges to and credits against the various reserve accounts, including depreciation, will be reflected in the estimated balance sheet for the ensuing years end; you simply close your books at the years end on the basis of your estimates and put the results together in the resulting balance sheet.

The time required to prepare such records may appear to be wasted to the small company operator; on the other hand, I am confident that it will be bound to be an interesting experience, not only in its preparation, but in the monthly or quarterly comparison with actual operation that will be afforded. I am also of the opinion that definite benefits will result from the planning that follows the preparation of such a budget and the ability of the operator to check from time to time the results of this planning and vary the budgeted items as conditions, over which he has no control, change.

The off-setting or balancing of lost revenue with reduced expenses or the increasing of effort in a campaign to sell stations if station losses become heavier than expected, all of these and many more benefits are derived from budgetary control.

It is quite possible that the use of your budget records before Regulatory Bodies in rate cases might be very helpful in impressing the need for rate revision on the Regulatory Body. While in itself a budgeted operation would not be a determining factor in a rate case, a Commission naturally would be impressed with the effort to control the company's operation to its financial advantage. The same thing holds true if it becomes necessary to borrow money either from an individual or banker or through the issuance of securities. The lender would, no doubt, feel more comfortable if he knows there is an operating plan and an opportunity to check it at stated intervals during the year.

While it is not possible for many of the smaller companies to secure the services of an auditor, a budget plan such as that outlined here can be set up by any person familiar enough with a telephone property to operate it. It appears to be an excellent step in the right direction for the small company in helping itself. I believe the benefit from experience of setting up such a plan and operating under it would far off-set the effort involved, even for the smallest Independent Company.

While with the larger companies the budget detail is considerably more extensive than that outlined in this article including a cash budget, estimated operation of reserve accounts, construction estimate break-down into toll and local, outside plant and central office, and other such informative data, nevertheless the simple form of budgeted operations we have outlined will provide excellent control for the small company.

In order to strip the plan of any complications it may be summarized as the making of an estimated operating statement reflecting desired and anticipated conditions for the end of the year ahead and then breaking down this estimate statement into quarterly or monthly segments so that you will have an opportunity to check your estimates with actual operations as they progress.

(THE END)

Telephone Engineer's TRAINING COURSE

ELECTRICAL FUNDAMENTALS FOR THE TELEPHONE MAN

Alternating Current Instruments---Part XV (Section 1)

General

ACCURATE alternating current measurements are more difficult to make than measurements on direct current circuits because of the inherent characteristics of A. C. instruments and the wide range of frequencies encountered in alternating current practice.

The common types of A. C. instruments are relatively insensitive, hence are not useful on measurements on high impedance circuits, and neither can they be used on A. C. sources where the frequency is greater than approximately one hundred cycles per second. There are, however, a large number of different types of A. C. instruments which will permit making almost any desired measurement and it is highly important that the use and limitation of each type be thoroughly understood.

Types and Field of Use of A.C. Instruments

ALTERNATING current instruments may be classified according to type into eight groups as follows:

1. Dynamometer (two coil type)
2. Soft Iron Vane type
3. Induction type
4. Thermo Couple type
5. Hot Wire type
6. Rectifier type
7. Vacuum Tube type
8. Cathode Ray & Mechanical Oscillograph type

The above types may be grouped according to their typical uses and frequency range as follows:

Average, Effective, and Maximum A.C. Values

IN dealing with alternating currents or alternating potentials there are three values used in expressing the magnitude of an A. C. wave. These are: **Average value, effective value,** and **maximum value.** The relation between these three values has previously been discussed, but will be again reviewed inasmuch as it is important that a good understanding of these terms be had if A. C. measurements are to be intelligently made.

These values may be defined as:

"The **average** value of an A. C. sine wave is equal to the average height of all the ordinates of one-half cycle of the wave."

"The **effective value** of an A. C. sine wave is equivalent to that of a direct current which would produce the same heating effect."

"The **maximum value** of an A. C. sine wave is the point of greatest current or voltage which is reached in each half cycle."

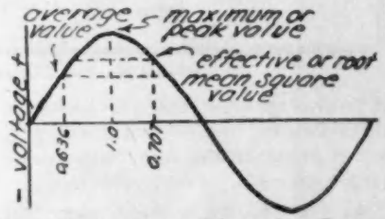


Fig. 42. Numerical Relationship Between the Three Values of an A.C. Wave.

Figure 42 shows the numerical relation between these three values in a true sine wave.

The question will at once arise as to what value of voltage or current will be indicated by a voltmeter or ammeter connected in an alternating current circuit. Obviously an A. C. instrument needle would not indicate the maximum value of the wave as this value exists only momentarily and during the balance of the cycle is much lower. With frequencies of more than a few cycles per second,

Type of Meter	Use	Usual Frequency Range
Dynamometer	Usually used in A. C. watt-meters, and other instruments involving two factors. Also used for voltmeters and ammeters where high accuracy is required. (Relatively expensive type instrument.)	0-133 cycles
Soft Iron Vane	Most common type of A. C. instrument. Used in both voltmeters and ammeters. The voltmeters are *not suitable* for use on high impedance circuits.	0-133 cycles
Induction	This type meter seldom used except for a few special power applications.	0-133 cycles
Hot Wire Type	Occasionally used in the radio, telephone, and sound projection fields.	Any frequency in the audio or radio range.
Thermo Couple	Measurement of both low and fairly high currents and voltages in the telephone, sound projection and radio fields.	0-30,000 cycles
Rectifier Type	Measurement of low and medium high potentials and in some cases low currents, *on both high and low impedance circuits* in telephone, sound and radio fields.	Any frequency in the audio or radio range.
Vacuum Tube	Measurement of low potentials in telephone, sound and radio fields.	Any frequency in the audio or radio range.
Oscillograph	Two types—Cathode Ray and Mechanical—Used in radio, and sound projection fields and in electrical laboratory work—Shows characteristics of wave form.	Mechanical type (0 to 10,000 cycles) Cathode Ray type—audio and radio frequencies.

Table No. 1 — Characteristics of A.C. Meters

it is also apparent that the inertia of the indicating needle would not permit it to fall to the zero value during each half cycle.

At first thought it would seem that the needle deflections would be proportional to the average height of the A. C. wave, that is, the **average value**. This is not true as an A. C. instrument deflection has been found to be proportional (for the majority of A. C. instruments) to the **effective value** of the A. C. wave. Inasmuch as the **effective value** represents an A. C. sine wave which will produce the same heating effect as a D. C. current of the same value, it is apparent that this would be the correct value to use in dealing with A. C. circuits. Practically all A. C. instruments are therefore calibrated to read in effective volts or amperes.

Reason Why D.C. Instruments Cannot be Used on A.C. Circuits

IN the D. C. instruments described in previous sections of this course a permanent magnet was used to provide the magnetic field in which the moving coil revolves, or in the case of the polarized vane type instrument, the magnet was utilized to polarize the soft iron vane which reacted with the electro-magnetic field created in a fixed coil. These permanent magnet type instruments are **suitable for direct current use only.**

If an alternating current is applied to a D'Arsonval moving coil or to the polarized vane type instrument, the indicator needle would tend to deflect first one way and then the other and if placed on commercial frequencies such as 60 cycles, there

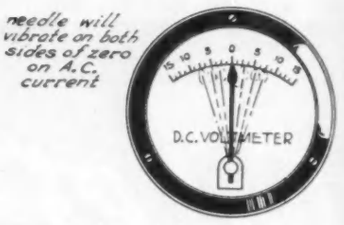


Fig. 43—Action of D.C. Voltmeter on an A.C. Source

would be 120 impulses per second. The coil would therefore simply quiver and not deflect in either direction; and the alternating current field created by the current passing through the coil would tend to destroy the magnetism present in the permanent magnet and thereby impair the calibration of the instrument. Therefore instruments containing permanent magnets should never be used on alternating current circuits. This is illustrated by Figure 43.

Dynamometer Type Instruments

FOR precision laboratory measurements of alternating current and voltage and for measurement of power and other measurements where two quantities are involved, a dynamometer type of A. C. movement is generally used. This movement consists of an assembly consisting of a fixed and a moving coil with an indicator needle fastened to the moving coil. The moving coil is so located with respect to the fixed coil that when current is passed thru the two coils, which are connected in series, a reaction occurs which tends to move the indicator needle across the scale, the movement being proportional to the current flowing thru the two coils.

Instrument deflections are not directly proportional to the applied voltage or current passing thru the coil; hence, the scale is somewhat cramped

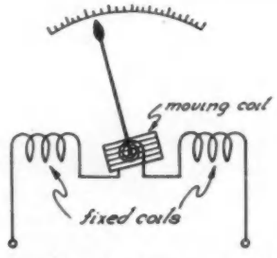


Fig. 44—Schematic of Dynamometer Type Movement

at both the zero and the high end of the scale. This type of instrument is not used in the ordinary A. C. voltmeters and ammeters ordinarily encountered in practice. It is used however in some of the more expensive type instruments such as are used in laboratories. Figure 44 shows sche-

matically the arrangement of the coils in a dynamometer type A. C. instrument. Damping is accomplished by mechanical means as is later explained. The frequency range is ordinarily 0-133 cycles, altho this type instrument can be designed for higher frequencies if necessary. **It may be used with fair** accuracy on D. C. circuits.

Soft Iron Vane Type A.C. Movements

THE majority of A. C. ammeters and voltmeters utilize what is known as the **soft iron vane** type movement. This movement is also referred to as the **repulsion type** A. C. movement. It consists essentially of a fixed coil of a few turns of heavy wire in the case of an ammeter and a large number of turns of fine wire in the case of the voltmeter. Inside the coil are located two soft iron vanes, one fixed and one movable, the indicator needle being attached to the movable vane. These iron vanes are magnetized by the fixed coil which surrounds them and are so located with respect to each other that they become similarly magnetized and a repelling effect takes place which tends to move the indicator needle over a calibrated scale. Figure 45 illustrates schematically the theory of the soft iron vane type A. C. instrument. The calibrated scale of this type movement is not linear and is cramped at the zero end.

In Weston and other instruments of the soft iron vane type, two pieces of

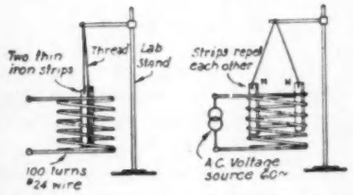


Fig. 45—Theory of Soft Iron Vane Type Movement

soft iron bent in the arc of a circle and placed concentrifically, one being movable and the other fixed, are used.

Inasmuch as no permanent magnet is used in this instrument it is not possible to use electro-magnetic damping. Damping is accomplished by means of a light aluminum fan operating in a sector shaped chamber in which small clearance is provided between the fan and the sides of the chamber. Small holes are placed in the chamber in such position that as the needle moves over the Scale the air is gradually pushed out thru the holes this giving a damping action similar to that obtained in D. C. instruments except that it is accomplished by mechanical means. This form of damping is used in practically all A. C. instruments with the exception of hot wire, thermo couple and copper oxide types.

Control of the indicator needle is accomplished using a spiral phosphor bronze spring and an adjustment which can be used to bring the needle back to zero on the scale when no current is passing through it.

The soft iron vane type instrument **can be used on either A. C. or D. C.** although unless a good grade of instrument is used there is a tendency for the instrument to read high on D. C. as compared to the calibrated A. C. scale values. This is due to the **hysteresis loss** in the soft iron vane. High grade instruments are for all practical purposes sufficiently accurate on either A. C. or D. C. The soft iron vane type instrument is accurate on frequencies only up to 133 cycles, altho special instruments are available to read higher frequencies. The upper limit, however, is less than 1000 cycles.

The Induction Type Movement

THE induction type A. C. instrument is but little used for general measuring work but is sometimes found in special power applications. This type movement consists essentially of a metal rotor to which is attached an indicator needle. The rotor is placed between pole pieces in much the same manner as the rotor of an induction type motor. A primary and secondary winding is placed on the iron structure surrounding the metal rotor which tends to revolve when current is passed thru the winding. Actual rotation of the rotor is prevented by an opposing force of a phosphor bronze spiral spring so that the deflections obtained are proportional to the current of the energizing coil. The action of this type instrument is very similiar to that of a single phase induction type motor.

Hot Wire A.C. Movement

ANOTHER type of A. C. instrument which, while not commonly used, has characteristics which make it particularly well adapted for certain types of measurements is the **hot wire type.** This type movement consists of a special resistance wire thru which the current to be measured is passed. The wire expands due to the heating effect of the current passing through it and this causes a needle to move over a calibrated scale. Figure 48 illustrates the theory of this type instrument.

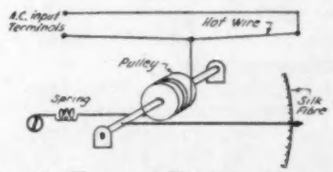


Fig. 48—Theory of Hot Wire Movement

This type of instrument has two outstanding advantages; viz, it is accurate on almost any frequency, that is, it can be used for measuring potentials or current of any frequency even up to several million cycles per second, and it is very rugged with respect to overloads. However, it has the disadvantage of not being highly accurate and it is rather sluggish in its operation. That is, it does not respond quickly to changes in the current passing thru the resistance wire. Its chief use is in connection with radio frequency measurements and also in connection with power work where large amounts of current are to be measured and it is not desirable to use a current transformer. This type instrument can be used on either A. C. or D. C. and can be shunted the same as a D. C. type meter.

Thermo Couple Type Movement

AN instrument movement particularly suited for medium and high frequency A. C. measurements is the **thermo couple type.** This type instrument utilizes a sensitive D. C. micro or milliammeter in connection with a thermo couple element. Figure 50 illustrates the usual method of connecting the D. C. meter to the thermo couple. The operation is as follows: When current is passed thru the heater wire a small voltage (known as a thermal e.m.f) is generated in the thermo element con-

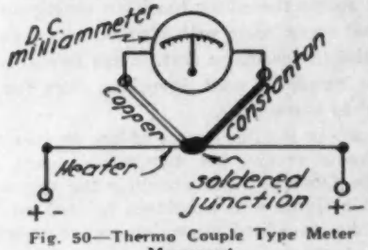


Fig. 50—Thermo Couple Type Meter Movement

nected to the sensitive D. C. meter. The indications of the D. C. meter are therefore proportional to the square of the A. C. current passing thru the heater wires. Such an instrument is often referred to as a "current squared meter". A current squared scale is greatly cramped at the zero end and quite extended at the upper end of the scale.

Applications

THERMO COUPLE instruments can be used on any frequency from a few cycles per second to several million cycles and are widely used in connection with both audio and radio frequency measurements. Unlike the hot wire type, the indicator needle moves quickly across the scale and is responsive to small changes in current. The thermo element is sometimes mounted external

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Conducted by the
Observer and his Gang

THE Observation Tower

If you have observations or even a friendly bit of argument suitable for use in this column, you are invited to send them along, which automatically makes you a member of the Gang. You will be anonymous—no names of telephone people or telephone companies are used in the column. Address "The Observer", in care of TELEPHONE ENGINEER AND MANAGEMENT.

IMPORTANT ANNOUNCEMENT

FOR some time we've been needling the editor of this magazine to get us some membership cards for Gang Members. But every time we mentioned the matter to him, he'd just put his head down on his desk and start to cry about the paper shortage.

Well, it looks like we're going to get some results at last. It seems the editor has been saving up the cardboard sheets that come home with his shirts from the laundry so he could print the cards on that. Since he's got only three shirts, and the laundry is a bit slow these days, the process has naturally taken some time.

So, in the due course of human events, each Gang Member should receive his membership card, signed personally by the Observer and entitling the member to certain inalienable rights and privileges printed on the card.

As an added attraction, we're trying to arrange to send each Gangster a set of our new Hospitality Cards. Each of these cards (when certain very reasonable conditions printed on it are complied with) will entitle the holder to one glass of beer. We think we can fix it so that, if the holder has a guest, he can also get two straws.

If you want to know what constitutes Gang Membership, read the paragraph in the heading of this column. Write us a letter, or even a postal card, on any subject you please, and you're in—with all the rights, privileges and appurtenances of membership and a membership card to prove it.

Say It With Figures

We've heard from a Gang Member who is an auditor, about what he thinks is wrong with the world. One trouble is, he says, that people don't take enough interest in figures.

He says too few people know how to make figures tell a story, such as in an analysis of a project and so on, and too few people know how to read the story correctly even when it is told properly in figures.

He says that, for instance, not many people know how to read a corporation balance sheet, or the earnings statement of a business, so that they get all the information about the business that they should obtain from it.

He thinks it would be a good thing if everybody working for a telephone company in positions of authority, even down below department heads, was familiar with the classification of telephone accounts, such as is prescribed by regulatory commissions. He thinks it would add to the efficiency of the individual if he or she knew the accounting result of any action taken by them which involved the expenditure of money, or expenses of any kind—and he points out that almost every action taken by anybody in the operation of a business involves expense of some kind.

He admits that figures are a headache to a lot of people, but he opines that an important informative bit of reading for anybody in a telephone company is the classified system of accounts that apply to that company. He stresses the proposition that the manager of every exchange, no matter how small it is, should be familiar with the classification and distribution of expenses, and expenditures.

We're sort of taken with the whole idea. We think it might help bring about the result this Gangster is talking about, if the auditor of a telephone company would get the folks in his company who ought to know these things together in a conference and explain something about accounting to them.

Of course, if he wasn't an auditor, he'd probably invite them all out to dinner. But auditors don't spend money—either the company's or their own—in any way as frivolous as that.

Smart Guys, These Engineers!

We took a crack at telephone engineers recently, and Gangster No. 18, who is an engineer, has been thumbing his nose at us and telling around that it is just a case of sour grapes. He says the reason non-engineer telephone men like to slap at engineers is because they know it takes a guy who is smarter than the average to be an engineer.

Maybe so, but we'll answer that by telling a story we have heard. It seems that four telephone engineers were Winter hunting in the north woods and they got lost, of course. So they had to hole up for the night in a trapper's cabin.

While the trapper was out getting wood for the fire, one of the engineers noticed that the stove was set on a pile of stones that raised it up about three feet from the floor.

The engineers got into a discussion as to why the stove was set up so high. One contended that it had been done to make the draft better. Another said the idea was to catch the lower cold air at just the right height for heating it efficiently. Another thought that it was to make it easy to stoke the stove without the trouble of bending over. And so on.

They couldn't agree on the reason, but they all agreed that it was for some highly proper scientific and engineering purpose. So, when the trapper came in, they congratulated him on his engineering acumen, and asked him just what his precise objective had been in putting the stove up so high.

The trapper grinned sheepishly and said, "Well, thanks gents, but the fact is that a length of stovepipe fell in the river when I was bringing the outfit up here, so I had to set the danged thing up that high to make the rest of the pipe reach the flue."

How Old is the Oldest?

A Gangster wants to know (not that it's any of his business) how old is the oldest man and woman actively engaged in Independent telephone work.

This Gang Member says he has a candidate for the honor: A man who is running an Independent telephone exchange at the age of 78. And doing a better job of it than a lot of young sprouts would, says this Gangster.

We've got nothing on the subject in our files. So we're turning the proposition over to our Snooper No. 4, who is the nosiest guy on our staff. He's also a good runner, which we anticipate he'll need to be when he starts asking women about their age.

Have you got a candidate for the honor? If so, write us. We intend to send an appropriate little present to the oldest Independent telephone man and the oldest Independent telephone lady that we find out about.

"All's grist that comes to the mill"

Gang Member No. 31, who is sales minded, writes us that he's been thinking that right after the war—when materials, manpower and telephone instruments are plentiful again—it would be a good idea for telephone companies to make a drive for residence extension telephones. He says he thinks so many people have been unable to get or (when they moved) to keep extensions during the war, that there will be a lot of "extension minded" people when residence extensions are again available.

No. 31 points out that residence extensions at a fair rate are profitable to the telephone company, and an inexpensive convenience to the subscriber. He thinks they help a lot to popularize telephone service.

We think he's got something, and we add that there's no reason for limiting the campaign to the sale of one upstairs extension. Why not, for instance, one in the kitchen too, so that the maid (assuming that anyone can ever get one any more) can talk to her boy friend without occupying the front of the house?

And, above all, sell an extension for the bathroom, because everybody knows that the minute you start to take a bath, somebody is sure to want to talk to you on the telephone.

More About Farm Telephones

In connection with the matter of farm telephones, on which subject we expounded at length recently, Gangster No. 142 has given us three closely spaced typewritten pages of advice, information and experience on the subject. No. 142 is in the general merchandising business, but he is also up to his neck in the business of running farm telephone systems, which means that he sees and knows telephony at the grass roots.

He thinks a major trouble with the "switcher" type of farmer-owned lines is cheap and slovenly construction, plus its natural companion, poor maintenance.

We think he has said a mouthful, and that one of the things to be done about switchboard telephone service is to get the farmer to realize that satisfactory telephone service cannot be given over makeshift lines indifferently maintained.

With the permission of No. 142, we're sending copies of his letter to the two committees of the United States Independent Telephone Association that are working on the farm telephone problem—the Plant Committee and the Commercial Committee. More power to 'em!

Safety First

Stop reading if you've heard about this telephone conversation:

Voice: "Is Jake there?"
Jake: "This is Jake."
Voice: "It don't sound like Jake."
Jake: "Well, it is Jake."
Voice: "You're sure you're Jake?"
Jake: "Sure I'm sure."
Voice: "Well, Jake, this is Henry. I want to borrow fifty dollars."
Jake: "I'll tell Jake when he comes in."

Telephone Advertising Institute Begins Active Operation This Month

THE Telephone Advertising Institute will begin its long-awaited advertising service during the month of September, R. A. Phillips, chairman of the USITA Advertising Committee, has revealed in an announcement of great importance to the Independent telephone industry.

The subscription to the Institute of 645 large and small telephone exchanges from 38 states and Alaska, together with that of others expected to subscribe soon, is considered sufficient indication of the support and cooperation of the Independent telephone industry to warrant inauguration of the service.

After a meeting of the Advertising Committee on August 28, Mr. Phillips stated, "The success of the Telephone Advertising Institute marks an achievement that has long been the goal of progressive Independent telephone men. The service of the Institute," he continued, "represents a convenience and a saving for both the very small and the very large telephone company, and it is hoped that those companies not yet subscribers will take this opportunity to obtain advertising material outstanding in excellence and economy, and at the same time contribute toward the progress of their industry. The committee has previewed advance layouts and proofs of advertising material, and can assure subscribers that their advertisements will contain the most effective copy, plus the finest in artwork, layout, engraving, and typography."

The first month's package of advertising material will be mailed to all subscribers about September 20. In addition to the regular supply of newspaper mats, a lobby poster, counter card, booth card, bill insert, employee pamphlet, news release, radio spot announcements, and a copy of the "Telephone Advertising Digest", this package will contain an extra set of lobby, booth, and counter cards. It will also include four extra mats, to cover the four extra

(Please turn to page 49)

Highlights of the Communications News

Important Communications developments of the past month, briefed for busy readers

by

ROLAND C. DAVIES
Editor, Telecommunications Reports

THE reconversion blueprint for the telephone industry—both the operating companies and the manufacturing field—will be formulated along definite lines during September.

At the same time, the program of "human" reconversion—the Demobilization Plan of the Army under which more than a million soldiers are expected to be released shortly after the defeat of Germany—formed another major facet of the X-Day program of the Federal Government.

In line with the policies recently enunciated by their chief, Acting WPB Chairman J. A. Krug that industry will be "substantially unrestricted" during the period of reconversion with a minimum of controls and "red tape",) Director Leighton H. Peebles, of the Communications Division, has readied his plans for the lifting on X-Day of the limitation orders and other controls for the telephone and telegraph industries. There will be no plan of allocating quotas of civilian production to the manufacturing companies.

The Communications Division for the past several weeks has been reviewing and analyzing the various limitation orders and other restrictions. So that actually before the formal declaration of the WPB reconversion policies by Acting Chairman Krug this week the Division had been well prepared to offer its reconversion ideas to the industry.

A meeting of the Telephone Operating Industry Advisory Committee is called for Sept. 20. The Committee will be asked for its views on the recommendations, already prepared by the Communications Division for the sweeping revision and relaxation of the various U orders, and to give any views of its own on what provisions should be withdrawn from the orders or what orders should be cancelled entirely when reconversion comes. Both the Bell System and the Independent telephone industry have been called upon by Mr. Peebles for their estimates of what equipment and apparatus are needed for their services after X-Day. This planning is in line with what Acting Chairman "Cap" Krug recently stated that essential businesses like transportation, communications, utilities, fuel and pipe lines will get what they need in the reconversion.

The California Independent Telephone Association was awarded the Chief Signal Officer's Certificate of Appreciation on August 14., at the City Hall in Santa Monica, Cal. Present at the presentation ceremonies were: (left to right) Curtis Newman, H. R. Cole, A. B. Fry, J. G. Campbell, F. N. Rush, Lois Larson and Orrin Gallup. Seated are: Col. S. W. Stanley, 9th Service Command, Signal Officer, who made the presentation; C. F. Mason, the association's president, who accepted on behalf of its members; and Secy. F. V. Rhodes.

However, it was emphasized that the Communications Division is going to seek the views of the telephone operating industry as to what protection it desires under the U-2 Order during the period of relaxation and reconversion so that it will be able to take care of the backlog of 1,500,000 unfilled telephone installation applications in an orderly fashion without high pressure attempts from certain segments of the public. It was felt that government as **represented by the WPB had taken the responsibility of imposing the controls during the war which has led to the situation of the unfilled telephone orders so the WPB should aid the industry as far as possible in the future period of relaxation and reconversion.**

Subjects For Manufacturers' Meeting

THE Telephone Equipment Manufacturers Industry Advisory Committee met Sept. 13 in Washington. Its agenda comprised the following: Further Discussion of the Surplus Property Problem; the Changes in Requirements including (a) what in general is the situation as to present orders, in terms of new war contracts, contract terminations, cutbacks, **civilian orders or inquiries,** (b) what questions or suggestions have developed in connection with Priority Regulation 25 or Order U-8 (possibly this latter order might be cancelled on reconversion day); and what other problems have appeared in this connection. The manufacturers will be asked, it is believed, what civilian production they can accomplish if military orders are cut back in various ranges of 10, 20, 30 or 40%. So far the cutbacks have been comparatively small.

For their civilian needs the operating telephone industry as has been cited before has two major bottlenecks—central office exchange equipment and telephone sets. Reconversion will speed up the production and installation of carrier equipment and coaxial cable projects will be expedited.

Maintenance & Repair

IN regard to the procurement of maintenance and repair materials by the operating telephone companies, the policy of Chairman Krug to confine all priority ratings after reconversion to military production will NOT upset the AA-1 rating for minimum maintenance and emergency repair as communications is vital to the Armed Services. In the case of deferred maintenance the companies will have to go into the open market after X-day. Likewise the lid for open purchases will be off on all projects not closely connected with the

(Please turn to page 50)

Relaxation of WPB Controls Expected Following E-Victory

ACTING Chairman J. A. Krug, of the War Production Board, announced September 5, following a meeting of the full Board, that the Army, Navy and major war agencies have unanimously agreed on a program designed to provide the utmost stimulus to reconversion when Germany is defeated, while at the same time, protecting production necessary for the Japanese war. (See opposite page).

Acting upon findings that there will be a reduction of about 40% of war production within three months after the defeat of Germany which will free over 4,000,000 workers, the Board decided to:

1. Remove almost all controls over materials immediately upon the defeat of Germany except those that are absolutely necessary to assure the reduced measure of war production necessary to beat Japan. This means that all manufacturers can use any plant and any materials that are not needed for military production for any civilian production.

2. The War Production Board and other Government agencies will do everything within their powers to assist and encourage industry in resuming civilian production and maintaining employment through the "know-how" of its industry divisions and industry and labor advisory committees.

3. The Board will maintain its organization and powers so as not to relinquish authority until it is certain that the war production program is adequate for victory over Japan.

The purpose of the decision, arrived at at today's Board meeting after a sweeping re-survey of the military and production situation, is two-fold. First, to assure full military production until final victory over Japan. Second, to free civilian enterprise to the utmost.

Industry is to be allowed in its own way, according to the availability of markets, men, materials and plants to do the swiftest and most effective job possible of restoring production, making whatever people want and affording maximum employment, just as quickly as possible. The plan is simple in outline. Detailed procedures for putting it into effect will be developed promptly. The plan provides as follows:

There will be only one preference rating, in addition to the present emergency AAA rating, and this rating will be reserved exclusively for military programs during the war against Japan. All other production will be unrated. Manufacturers will be permitted to accept unrated orders but they will be obliged to fill rated military orders ahead of all other business.

After Germany's collapse no programming of civilian production will be necessary. The information which the War Production Board has on the available supplies of materials, components, facilities, and manpower indicates that maximum civilian output can be achieved without detailed priorities regulation from Washington. The War Production Board will retain its Industry Divisions and its Industry Division Requirements Committees whose job will be to make certain that no one is permitted to procure an unreasonable amount of any material or product, that needed materials and components are made available to top essential activities such as transportation, utilities, and fuel, and that small business is given an equal opportunity to secure materials and supplies.

A very few allocation orders will be continued for materials that remain tight, such as lumber, textiles, and certain chemicals. For example, it will be necessary to continue strict controls of the use of lumber, particularly for major construction projects.

The Controlled Materials Plan for allocating steel and copper will be continued only for the quarter in which hostilities in Europe cease.

Paul V. McNutt, Chairman, War Manpower Commission, was present at the meeting, endorsed the program outlined and indicated that the WMC will shortly announce a program for manpower after Germany's collapse designed to dovetail with the WPB procedure.

Mr. Krug said in deciding upon immediate and drastic elimination of production controls that War Production Board is planning on keeping its steering gear and brakes in good condition. During the past three years, the WPB industry divisions have developed methods that have been notably successful in dealing quickly and effectively with the industrial problems. This "know-how" will be kept available for immediate use as needed. Also available will be the Industry Advisory Committees, the authority to allocate materials and to schedule production of components when supply becomes critical. If troubles should occur in military production or civilian output, WPB will be able to handle them on a spot basis. With the removal of controls on production, industrial, civic and labor leaders in every community will be called upon to use their ingenuity and resourcefulness to overcome the home front difficulties on the way back.

"Haven't you guys got that periscope repaired yet?"

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(Esquire, April 1944)

USITA 1944 Convention Program Outstanding

Clyde S. Bailey

Executive Vice President Clyde S. Bailey of the United States Independent Telephone Association has informed us that the coming National Convention on October 10, 11 and 12, Stevens Hotel, Chicago, will have an outstanding program with many features scheduled. The program is now completed and the entire three days will be of utmost importance to the telephone industry.

In Mr. Bailey's report, he informed us that Walter S. Gifford, president of the American Telephone and Telegraph Company, had accepted an invitation to address the convention. His address should be of major interest to everyone in the telephone industry.

The Independent Pioneer Telephone Association will hold their annual business meeting during the afternoon of October 10 and will present one of the outstanding convention features, as their program will include a speaker of world importance. It will be entertaining as well as instructive, according to G. B. Foscue, president of the Pioneers.

Unlike the last two gatherings, this will be a three-day convention. The first day will be given over to the group conferences—Plant, Traffic, Commercial and Accounting. Each of these committees will have a full half day in which to discuss the technical features of its branch of the business.

The Plant conference will hear a discussion of "Lightning Protection for Telephone Plant", of "Postwar Application of Radio Channels to the Telephone Industry", of "Problems Incident to Conversion from Manual to Dial Operation" and of the "Practicability, Value and Technique of Preventive Cable Maintenance".

The Traffic conference will present a dramatization of the handling of various aspects of different traffic troubles with a cast of seven persons. This important feature will no doubt attract a very heavy attendance.

The Commercial conference have scheduled a discussion of such significant topics as "Unattended Dial Installations", "The Farm Telephone Problem", "Advertising" and "Rates".

The Accounting conference will have under discussion the principle question marks in the field of telephone accounting that are engaging the current attention of the indispensable people who tell us what the state of the business is.

An important feature for the smaller telephone companies, as well as the larger ones, is slated for the afternoon of the second day, following Mr. Gifford's address. Employment relations problems under the following headings will be discussed: (a) Wage Trends and their Effects on the Industry; (b) Ways and Means for the Small Company to Meet the 40c Minimum; and (c) The New Learner Regulations.

The Postwar Plans and War Activities committee, at this time perhaps our most important subject, will present their report as to the foreseeable future and what we should do about it.

The tax situation will be the subject of a panel discussion with particular attention on: (a) This Current Wave of Relating Rates to Excess Profits Taxes; and (b) What We Should Seek —And What We May Expect—in Postwar Taxes.

Walter S. Gifford

Pennsylvania Commission Approves Keystone Sale

The Pennsylvania Public Utilities Commission Aug. 27 made the final approval of the purchase of the Keystone Telephone Co. of Philadelphia by the Bell Telephone Co. of Pennsylvania, which will end the duplicate telephone systems in that city—the last major community of the United States which had competitive telephone service.

The purchase price of $13,431,454 was ratified by the Pennsylvania Commission. Previously the FCC had approved the acquisition in an order on March 16, 1943.

Actually the consolidation will affect only 7% of the Keystone subscribers, as 93% of the Keystone users also are Bell of Pa. customers. The merger of facilities also has to await the sanction by WPB of the necessary materials and equipment. Virtually all of the Keystone subscribers were business firms as that Independent company offered a special low business telephone unmetered rate. All of the Keystone employees will be taken over by the Bell of Pa.

Hawaii Company Files Stock Issue Program

The Mutual Telephone Company of Hawaii during August filed a registration statement covering a proposed issue of 100,000 shares of $10 par value capital stock with the Securities and Exchange Commission. Stockholders of record September 1 will be offered one share for each five shares of capital stock now held and transferrable warants evidencing subscription rights for full shares are being issued by the company on September 15, expiring November 1.

Full shares representing fractional interests and shares called for by warrants not exercised will be sold at public auction in Honolulu at not less than $10 a share on or before November 10. The stockholders will purchase the new stock at par. Estimated at $988,410, the proceeds of the sale will be applied to working capital and toward the company's $5,171,000 expansion and improvement program. The Mutual Telephone Co. of Hawaii has a notable history of expansion and improvement and this new program follows that course.

Reduced Rates to Central America

Reductions, ranging from $1.50 to $6.75 in rates for radiotelephone service from the United States to Central American and Caribbean points were announced by the A. T. & T. as effective Sept. 1.

The U.S.I.T.A. Annual Meeting Will Be Important to YOU!

The 48th Annual Convention of the

UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

Stevens Hotel • OCTOBER 10-11-12 • Chicago

The program for this meeting has been built around the necessities of the small companies. They will be discussed by outstanding men in the telephone field. As a war connected industry we must give timely thought to our war and postwar problems. Make your plans now to attend.

Highlights of the Program—

"The Telephone Industry Today and Tomorrow"—
President Charles F. Mason

Where Do We Go From Here on Wage-Hour Matters?

Ways and Means for the Small Telephone Company to Meet the 40-cent Minimum

The New Learner Regulations

Some New Slants on Directory Publishing

What We Should Seek—And What We May Expect—
In Postwar Taxes

Reports of Committees—

- Toll Compensation and Settlements
- Telegraph
- Advertising
- Postwar Plans and War Activities
- Plant
- Traffic
- Commercial
- Accounting

Division Conferences—

PLANT

(a) Lightning Protection for Telephone Plant
(b) Postwar Application of Radio Channels to the Telephone Industry
(c) Problems Incident to Conversion from Manual to Dial Operation
(d) Practicability, Value and Technique of Preventive Cable Maintenance

TRAFFIC

Dramatization of Methods of Handling Traffic Troubles

COMMERCIAL

(a) Unattended Dial Installations
(b) The Farm Telephone Problem
(c) Advertising
(d) Rates

ACCOUNTING

(a) Treatment of indirect costs and overheads by accounts and exchanges
(b) Payroll practices to meet present-day conditions
(c) Importance of maintaining adequate accounting records

Annual Business Meeting
Independent Pioneer Telephone Association
of the United States
2:00 P.M.—October 10

We are pleased to announce that President Walter S. Gifford of the American Telephone and Telegraph Company has accepted an invitation to address this meeting. His address will be delivered at the afternoon session of October 11.

The Officers and Directors of the United States Independent Telephone Association Cordially Invite

Every Independent Telephone Man to be Present

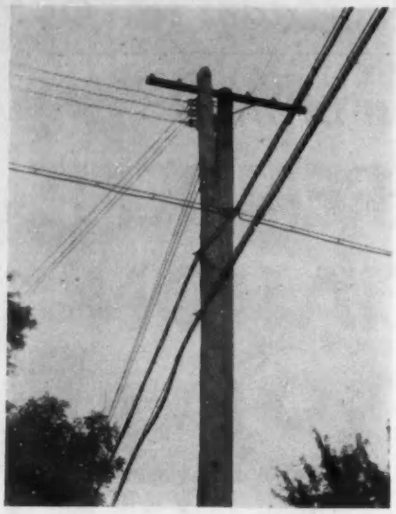


Figure 2—Bow in Cable at Supporting Pole.

By J. S. REED, JR.

A MAINTENANCE ARTICLE

Getting the Most Out of Aerial Cable Plant

LEAD sheathed cable is considered to be the most reliable of all types of telephone circuits. This is due to the fact that the cable conductors are bunched together in a single compact group surrounded by a continuous protective covering of lead that is not easily damaged by storms as are open wire lines. When properly installed, aerial cable will last for 30 to 40 years, provided it is well maintained throughout its service life.

The chief function of the lead covering is to keep moisture away from the paper insulated conductors. Because the lead sheath does not have the requisite mechanical strength to resist crystallization or cracking under even relatively light strain, flowing under pressure, and wearing away under friction, it is necessary to install cable in such a manner that it will not be subjected to mechanical damage of any kind. This calls for proper construction methods in the initial installation of the cable plant.

GENERAL MAINTENANCE WORK ORDER
OR
DEFECTIVE LINE REPORT

TO ..... 19.....
EXCHANGE .....
TEL. NO. ..... NAME .....
M. F. PR. ..... TER. NO. ..... PR. .....
ADDRESS .....
REASON .....
DESCRIPTION OF WORK .....
.....
.....
.....
.....
.....
.....
.....
SHOULD BE COMPLETED .....
WHEN COMPLETED RETURN TO .....
COMPLETED BY ..... DATE .....
REMARKS .....
.....
.....

Figure 1—Typical Inspection Form for Reporting Defects in Cable Plant.

Unfortunately, even when cable plant is correctly installed in every detail (which is rarely the case) many situations arise in the course of time to upset this pattern of perfection. This is due to several causes, among them loosening of poles and guys, slipping of cable supporting rings on the messenger, and vibration from contact with trees allowed to grow into the cable.

It is evident from the foregoing discussion that, in addition to proper construction methods, a sound maintenance program is needed to obtain the maximum possible life from cable plant. Cable is more expensive than other forms of telephone plant and certainly warrants good care in proportion to its value.

This article discusses methods of correcting improper cable construction where present and the periodic inspection and repair of cable plant under a well planned maintenance program.

Cable Maintenance Program

SYSTEMATIC inspection of cable plant at regular intervals, coordinated with line tests during wet weather will reveal defects in cable plant. Tests are made of all telephone lines and those showing less than 50,000 ohms should be marked for careful check to determine if the trouble is in the cable or in the open wire or drop extensions. Trouble in the cable is often indicated by a certain group of lines corresponding to the defective pairs in the same cable sections showing low leakage resistance.

Periodic inspections may be made as often as the condition of the cable plant warrants, usually every two years or less, corresponding to tree trimming cycles. In fact, the greatest economy in small exchange maintenance results when cable repair or tree trimming is carried on with the inspection routine. In larger exchanges, it is advisable to employ a regular inspector or a competent exchange man with a helper to check the condition of the cable plant,

(Please turn to page 60)

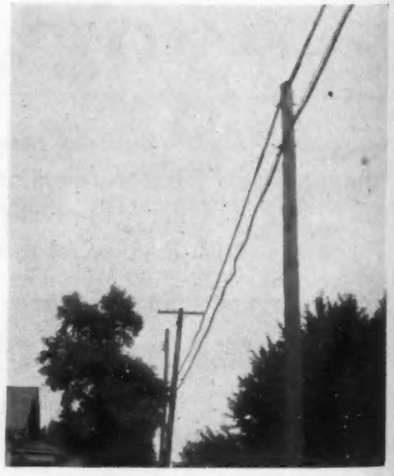


Figure 3—Wavy Appearance of Cable due to Excessive Messenger Tension.

EVEREADY
AMERICAN COACH
"YANKEE"
MANCO
Gardiner
FLUX-FILLED SOLDER
KESTER
FLUX-CORE
SOLDER
Pyrene
FIRE EXTINGUISHERS
QUEEN INSTRUMENTS
TRADE
VULCAN
MARK
PAINE
Frankel
Solderless
Connectors
JAMES R.
KEARNEY
CORPORATION
ST. LOUIS, MO.
MSA
SALISBURY
AND KINDRED PRODUCTS
DOS
ESTABLISHED 1906
Firestone
CATTARAUGUS
CARSON-NEWTON CO.
ARMSTRONG
CORK COMPANY
GE
FANSTEEL
JUSTRITE
WJ
COOK
IWAN BROS.
SQUARED D
ELECTRICAL EQUIPMENT
UNIQUE
Mueller Electric Co.
HUBBARD
EVERSTICK
THE CLYDE CUTLERY CO.
Clyde
1850
CLYDE, OHIO, U.S.A.
PREMAX
ELECTRICAL INSTRUMENTS
WESTON
DILLON
LUFKIN
ELECTROX
C-R
GRAY
SEYMOUR
HYKON
SMITH
TRADE
HOPE
MARK
BLACKBURN
Sterling
Prest-O-Lite
ESTWING
Telex
AMES BALDWIN WYOMING CO.
PHILCO
MATTHEWS
CORPORATION
ST. LOUIS, U.S.A.
Copperweld
Simplex Jacks
ABC
INDUSTRIES
P&H
PENTA
HOLTZER-CABOT
ROCKFORD
GREENLEE
ILL. U.S.A.
GEO. E. WILLIAMS
UNITED STATES TENT & AWNING
DIAMOND EXPANSION BOLT
Premier
BURR
KEY
BILT
T-C
TAYLOR-COLQUITT CO.
TIMBER CONSERVATION
Newman
Manufacturing
Company Inc.
"America
Beauty
DICKE
SHALLCROSS
KLEIN
TOOLS
EST. 1857
LM
SUB-CYCL
NATIONAL FIREPROOFING
The Electric Products Co.

Electrical Fundamentals For the Telephone Man

(Continued from page 35)

to the D. C. meter and may be of the vacuum tube type; i. e., the element placed in a vacuum. By the use of the thermo element principle, A. C. meters which will read current values as low as a few milliamperes up to 20 or 30 amperes on frequencies of from a few cycles to several million cycles are made available. One disadvantage of the thermo couple type instrument is the low overload capacity which seldom exceeds 50%. That is, if an overload of greater than 50% of the full scale value is passed thru the meter, the heater element is usually burned out. The ordinary D. C. and A. C. instrument movements previously described are capable of standing a considerable overload. In the smaller thermo couple instruments the thermo element is mounted directly in the case with the D. C. movement, whereas in larger and especially the more sensitive instruments a vacuum type thermo couple mounted external to the D. C. movement is used.

Rectifier Type Instrument

ANOTHER type of instrument suitable only for A. C. measurements which was placed on the market by one of the leading instrument manufacturers about 1928 and which has since become quite popular is known as the **rectifier type.** It is suitable for use on A. C. sources having frequencies of a few cycles per second up to 30,000 cycles. It is unique as compared to A. C. instruments heretofore described in that **it has a high degree of sensitivity,** that is, the current required per volt of deflection in the case of the voltmeter is very low as compared to ordinary types of A. C. instruments. This instrument consists of a small copper oxide rectifier (arranged in a bridge rectifying circuit) connected in series with a sensitive D'Arsonval type microammeter as shown in Figure 52.

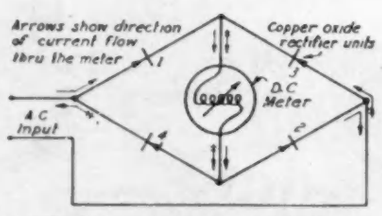


Fig. 52—Schematic of Copper Oxide Type Movement

When connected to an A. C. source the alternating current flows thru the bridge type copper oxide rectifier in such a manner that each half cycle flows thru the D. C. meter in the same direction and therefore the A. C. wave is converted to D. C. and is read on the D. C. meter. The scale is calibrated to read in terms of A. C. (effective) volts.

A. C. voltmeters with resistance as high as several thousand ohms per volt are thus made available by the rectifier type principle. Such instruments are proving particularly effective in connection with transmission measurements in the telephone and sound projection fields. An enlarged view of a Copper Oxide rectifying unit is shown in Fig. 52-1.

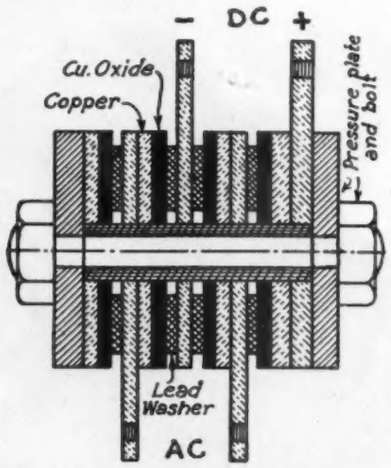


Fig. 52-1—Enlarged View of Construction of Copper Oxide Rectifier Unit

Sources of Error in Rectifier Type Instruments

THERE are several sources of error which are inherent to rectifier type meters. While these are not sufficiently important to hamper the meter's usefulness, it is advisable to be familiar with such factors as would tend to give a reading slightly in error. The factors which affect the accuracy of rectifier type meters are, in the order of their importance: Wave form, frequency, resistance characteristic of copper oxide rectifier, and temperature.

Errors due to wave form may occur where other than sine waves are measured. The reason for this is the fact that the meter deflection is proportioned to the average value of the rectified wave, but the meter is calibrated in terms of root mean square values. The magnitude of errors from this source depends on the amplitude and phase in the source being measured.

Errors due to frequency result from the fact that the instrument deflections decrease for a given voltage, as the frequency increases. For frequencies above 1,000 cycles up to 35,000 cycles the actual reading should be corrected by a factor of 0.5 percent for each 1,000 cycles.

Resistance Variation

ERRORS due to the resistance characteristics of the copper oxide rectifier may result from the fact that the resistance of these rectifying units depends on the current flowing thru them and decreases as the current flow increases. This variation in resistance is calibrated into the scale of voltmeters, and results in no error so far as instrument indications are concerned.

The fact that the resistance varies with the deflection of the meter is of no serious consequence except where a fairly low resistance meter might be used on a high resistance circuit. This variation in resistance as well as the magnitude of the full scale resistance does materially handicap the usefulness of the rectifier type milliammeters in certain types of circuit testing. For example, one type of 0 to 2 milliampere rectifier type meter has a resistance variation of from 180 ohms at full scale to approximately 325 ohms at 0.3 scale. Obviously such a meter could only be used in a circuit having an impedance of several thousand ohms, if error were to be avoided.

Temperature Effects

ERRORS due to temperature result from changes in the rectifying properties of the copper oxide rectifier as the room temperature varies. These errors are small over a temperature range of 64 degrees to 86 degrees Fahr., and for all practical purposes need not be considered. A typical copper oxide meter is shown in Fig. 53.

The foregoing paragraphs which discussed the possible source of errors that may occur in the use of rectifier type instruments are not intended to imply that such meters are not accurate but rather to acquaint the reader with their operating characteristics so that they will be properly used. Under ordinary use the total error from all sources mentioned will seldom exceed a few percent. Rectifier type meters are available as voltmeters, milliammeters and microammeters. The voltmeters can be obtained with resistance of from 1000

Fig. 53—Copper Oxide Type Instrument

to 2000 ohms per volt, while the resistances of the microammeters and milliammeters will depend on the range being higher with the lower current ratings.

Vacuum Tube Voltmeters

THE vacuum tube voltmeter is a special type of measuring instrument used in connection with medium and high frequency measurements on circuits or sources of relatively high impedance. This instrument has two outstanding advantages; first, it can be used on any frequency; second, it takes no power from the source being measured. It consists essentially of a vacuum tube and associated plate and filament batteries together with a sensitive micro or milliammeter in series with the plate circuit of the tube. Figure 54 illustrates a basic vacuum tube voltmotor circuit. The theory of operation of this type instrument is as follows:

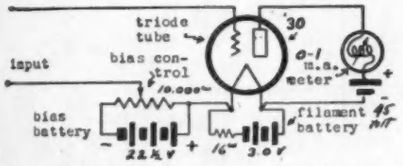


Fig. 54—Basic Vacuum Tube Voltmeter Circuit

The grid of the tube is so biased that no plate current flows when there is no potential applied to the input circuit. If the A. C. potential to be measured be connected to the input circuit, the negative half cycle will be ineffective in causing a further reduction in plate current as the normal negative grid bias keeps the plate current down to zero. On the positive half cycle, however, the grid will become less negative and plate current will flow. It is therefore possible to measure A. C. potentials by using the vacuum tube as a rectifier and reading the magnitude of the rectified current on a D. C. meter in the plate circuit of the tube.

The conversion of the reading of the D. C. meter in the plate circuit is made by means of a conversion curve, or in some cases in connection with commercial instruments of this type the reading in A. C. volts is calibrated

STROMBERG-CARLSON
RECOMMENDS—

Nicopress
REDUCING SLEEVES

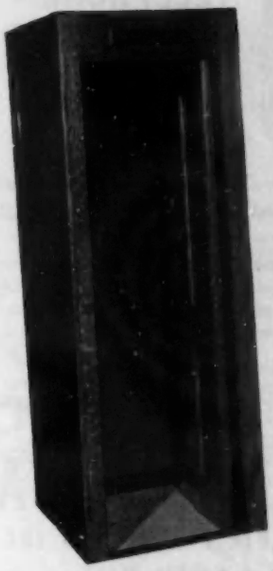
Unsurpassed for splicing two wires of different sizes . . .

THE NATIONAL TELEPHONE SUPPLY COMPANY

★

Splices are so tight the conductors can not pull out

★



CHURCHILL
An ATTRACTIVE TELEPHONE BOOTH

Not only attractive—but comfortable and private—the **CHURCHILL** No. 100 Folding Door Telephone Booth will increase your pay station business.

Operating companies have found the **CHURCHILL** No. 100 Folding Door Telephone Booth a builder of pay station business.

It is constructed as a single unit and equipped with a reinforced back panel for mounting a wall telephone or coin collector.

The **CHURCHILL** Booth is made of selected white oak and is available in light or medium oak in a satin finish.

Included as standard equipment are electric light and automatic electric ventilator.

Overall height is 84¾"; width, 29"; depth, 30½". Shipped knocked down and crated.

Illustrated literature available.

STROMBERG-CARLSON
PROGRESS IN TELEPHONY

STROMBERG-CARLSON COMPANY
Factory and General Offices: Rochester 3, New York, U. S. A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

For Quicker Longer Service

SYLVANIA TUNGSTEN TELEPHONE SWITCHBOARD LAMPS

ACTUAL SIZE

FASTER—Light up in one-fifth second.

BRIGHTER—Maximum end-on candle power. Sharper daylight signals.

STRONGER—Average life 1,500 hours of high brilliancy. Strong breakage resistant filament. Tight, correctly formed bases.

Available in: CLEAR
NATURAL RUBY*
NATURAL GREEN*

*While present supply lasts

SYLVANIA
ELECTRIC PRODUCTS INC.
SALEM, MASS.
Formerly Hygrade Sylvania Corporation

directly on the D. C. meter dial.

One of the principal advantages of the vacuum tube voltmeter as compared with a thermo couple or hot wire type instrument is the fact that it has practically **infinite input impedance.** That is due to the fact that the input resistance or impedance of the vacuum tube voltmeter is almost infinite at the lower frequencies and extremely high at the higher frequencies, therefore it draws practically no current from the source being measured.

The normal range of typical commercial type vacuum tube voltmeters where only a single tube is used is from about 0.2 volts up to 3 or 4 volts. This range can be extended upwards by means of a high resistance potentiometer or voltage dividing type network, connected across the input circuit. Where it is necessary to measure extremely small voltage in radio frequency or audio frequency circuits, it is necessary to use calibrated amplifiers between the vacuum tube voltmeter and the source being measured. These are merely calibrated radio or audio amplifiers which step up the low voltage to a value sufficiently high to be measured on the vacuum tube voltmeter. The total voltage is then computed by knowing the voltage gain of the amplifiers connected between the vacuum tube voltmeter and the source.

Commercial Types of Vacuum Tube Voltmeters

ALTHOUGH simple homemade vacuum tube voltmeters usually take the form just described, those made by the instrument manufacturers are more complicated and are so made that the accuracy of the readings is not affected by normal changes in the supply voltage.

A popular type of vacuum tube voltmeter put out by the General Radio Company utilizes a bridge circuit as shown in Figure 55. In this circuit a three element tube is used and the plate filament resistance utilized as one arm of the bridge. A 22½ volt battery is used to furnish both filament current and plate potential. The battery being common to all four arms of the bridge, it will not affect the readings obtained if its voltage is higher or lower than normal.

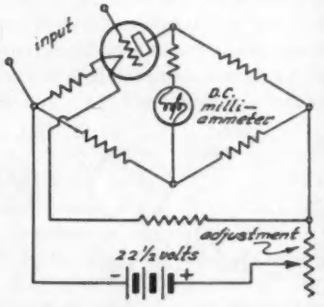


Fig. 55—Bridge Type Vacuum Tube Voltmeter Circuit

The source under measurement is connected across the grid and filament of the tube, hence varies the thermionic resistance of arm A of the bridge circuit. The bridge being unbalanced by the input voltage causes the microammeter to deflect, thus giving readings which are proportional to the input voltage. A rheostat R_1 enables the bridge to be balanced with zero input.

The Weston Model 669 Vacuum Tube Voltmeter

THE Weston Model 669 vacuum tube voltmeter makes use of a D. C. Model 301-100 microampere meter, a 78 type screen grid tube, and a 1-V rectifier tube arranged in the circuit as shown in Figure 56. This instrument is capable of measuring alternating current voltages from 1.2 volts up to 16 volts. It has six calibrated voltage scales. These scales are calibrated in root-mean-square volts.

The instrument has two variable adjustments, one a zero adjuster, for setting the meter on zero prior to making a reading, and another a calibrating adjustment that is seldom changed and is used only when changing tubes or when

12 Reasons WHY LEADING TELEPHONE COMPANIES STANDARDIZE ON

'44 P&H PENTA

P&H PENTA POLES
FULL LENGTH TREATED
NORTHERN WHITE CEDAR

No. 9 .. They are light in weight —Easier to transport and set.

Watch for Reason No. 10

P&H

PAGE AND HILL CO.
MINNEAPOLIS, MINNESOTA · 50 CHURCH STREET, NEW YORK, N. Y.
"STILL IN THE LEAD"
Distributed by AUTOMATIC ELECTRIC SALES CORPORATION . . . STROMBERG-CARLSON COMPANY

the instrument seems to be out of adjustment and the readings in error. A range selector switch enables the selection of the most suitable range. A 110 volt 60 cycle source is "stepped up" by means of a transformer and rectified by the type 1-V tube. The D.C. rectified output passes through a filter system across the output of which is a Neon glow type regulator tube. The purpose of this tube is to maintain a constant D. C. voltage so that the calibration of the instrument will hold. It operates by virtue of the fact that it takes more current from the line when the voltage is above normal, thereby inducing a compensating voltage drop in the resistors in the filter system. When the voltage drops below normal, the tubes take less current from the line, thereby resulting in an increased voltage across the output due to the lower drop in the filter resistors.

(Section 2 and Questions will appear in November)

ADVERTISING (See page 37)

weeks in the long months of the year.

Many special services are being planned by the Institute, such as rate campaigns, radio transcriptions, etc. Poster frames, truck posters, and other additional material will be made available as the service progresses.

The USITA Advertising Commmittee, under the chairmanship of Mr. Phillips, has put much time and effort into the establishment and ultimate success of the Institute. When appointed last March, the committee investigated the need and possibilities of establishing the nationwide advertising, publicity and public relations service that telephone companies have been seeking for many years. The USITA Board of Directors unanimously and enthusiastically approved the report of their Advertising Committee, which recommended and outlined the details of the Institute program.

The advertising agency of Bozell & Jacobs, Inc. was chosen to direct and manage the Telephone Advertising Institute, and promotion was begun at the Executives War Conference in April. Those attending this and subsequent state association meetings will remember the impressive display illustrating and explaining the service of the Institute. An equally attractive display is now being planned by the Institute to be shown at the coming National Convention in October.

Mr. Phillips and his committee urge every telephone company not yet subscribed to the Institute to send their inquiry or application immediately to the Telephone Advertising Institute, 326 West Madison Street, Chicago 6, Illinois.

STROMBERG-CARLSON
RECOMMENDS—

Your Cableman's Kit ---Is it Complete!

The DILLON TEMPEROMETER registers correct temperatures of Paraffin—Compounds—Wiping Solder—Impregnation Wax—Cable Damming Waxes.

Make sure the job is *perfect every time.* For best results, materials must be heated to specific temperatures. The DILLON TEMPEROMETER actually registers these temperatures for you—dial calibrated from 150° to 1000° F.

Special Features:
- Rugged and Compact
- 9" in length
- 5⅝" length of handle
- ¾" tube diameter
- 2⅛" dial diameter
- Laboratory and Field Tested
- Fully Guaranteed

AN UNBREAKABLE METAL THERMOMETER

STOP GUESSWORK IN HEATING CABLE MATERIALS

Higher sustained voltage
Longer life
Rock-bottom economy

These qualities—more important now than ever before—are assured through the constant supervision of America's largest dry battery laboratory.

Made by the makers of "Eveready" "Air Cell" Operators' Transmitter Batteries.

STROMBERG-CARLSON COMPANY
Factory and General Offices: Rochester 3, New York, U. S. A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

Highlights of the Communications News

(Continued from page 38)

military services. The companies can also build up their inventories.

Equipment Needs in Europe

ON the rehabilitation of the telephone systems in Liberated France and Belgium and the Netherlands, the Washington government authorities have considerably lowered their sights from the previous estimates of the telephone equipment needed. Instead of preparing estimates of the equipment and materials needed for the revamping of the telephone facilities in the former Nazi-occupied nations, which had been destroyed by the effects of the war, German demolition and "underground" sabotage, the FEA and WPB are now awaiting actual concrete reports from those countries and will map their programs of equipment requirements on a factual basis rather than estimates.

Army Demobilization

THE fairest method to effect partial demobilization through impartial standards would be through the selection of men as individuals, rather than by units, the War Department declared in its plan. Simultaneously, Secretary Forrestal emphasized that, while the Navy agreed in principle with the Army plan, the Navy is still expanding its enrollments and will continue to expand, making any demobilization impossible until after the defeat of Japan.

The adopted plan of the War Department will include an "Adjusted Service Rating Card" issued to all enlisted personnel after Germany's defeat and will be scored on four factors: service since September 16, 1940; Overseas Credit; Combat Credit including all awards; and parenthood. The values to be announced after the cessation of hostilities, will be used to select the men declared surplus in each overseas theatre and in the United States and also when some of such surplus men are declared nonessential and returned to civilian life. However, the first priority in the readjustment program will be the transfer of elements from theatres no longer active to the Pacific war zone, or from the United States to the Pacific war zone and all available transportation will be utilized for this undertaking.

Commenting that our Nation will be wise to follow the same pattern in demobilizing in home localities, commensurate with ability for absorption, as was pursued in the draft, Major General Lewis B. Hershey, Director of Selective Service, recently pointed out that the "brunt of the job will fall on citizens of the community and the extent of their active participation to do this job will control very largely the extent to which the job is well done."

Partial solution to the demobilization problem in terms of postwar jobs may result from the estimated 800,000 to 1,000,000 veterans who may study eventually at educational institutions of their own choice under the provisions of the Servicemen's Readjustment Act (G. I. Bill of Rights).

Another diversion from their prewar jobs is expected to be the indication that a high percentage of young men and women in the armed forces—possibly 3,000,000 out of the 11,000,000 now enrolled—may seek to enter business for themselves after the war. This was pointed out in an article on the GI Bill and Small Business in the September issue of Domestic Commerce, monthly publication of the Department of Commerce. The article noted that the GI Bill provides specific aids to veterans who want to enter business for themselves and the local banker and other groups will be ready to help in a practical way. However, Quincy Adams, Chief of the Small Business Division of the Department, cautioned that veterans must learn everything possible about their chosen line because they will face stiff competition and may be subject to failure.

WANTS HIS BED

The thing O. M. Anderson, secretary and manager of the Huron (Kansas) Telephone company, seemingly wants most is a little time in bed and fewer state and government reports to file.

He has sent a couple of reports to the Kansas state department of revenue and taxation and, while fighting the man power problem, hopes to find time some day to get other report blanks on his desk filled out.

In a letter to Chairman Ljungdahl of the state tax department, Anderson said:

"Inclosed are two reports and if God keeps my strength up I will in a few days get all the other reports to you. Please inform the departments so they will rest easier about it.

"Folks, I have been and am yet doing five peoples' job, I absolutely work day and nite. I never go to bed. It is over a year since I was in bed. Every few days I drop down on a lounge and relax and sleep from an hour to three and up and at it again.

Krug Elevation Helpful To Telephone Industry

THE affairs of the telephone industry in the reconversion planning by the War Production Board should be benefited with the elevation of J. A. ("Cap") Krug to the elevation of J. A. that agency because he is familiar with the operations and problems of the telephone industry through his previous lengthy career with state commissions and the FCC.

The leading executives of the telephone industry became acquainted with Mr. Krug during the past two years or so, particularly in their industry advisory committee sessions, many of which Mr. Krug attended while he was Director of the Office of War Utilities. Since the new WPB chairman has always had a high regard and respect for Director Leighton H. Peebles of the Communications Division, it is anticipated that Division will operate without any change or interference with its policies as a result of Mr. Krug's elevation.

In line with the aims of the new WPB machinery all greased to move into high speed for reconversion when Germany collapses, Mr. Peebles and his Communications Division staff have made a thorough analysis of all existing limitation orders and other controls which have been imposed upon the telephone industry during the war period. It is expected that upon the surrender of Germany the vast majority of these restrictions can be lifted at once.

At that time or even sooner there will be the termination of a number of the provisions of the U-2 Order, together with the orders covering the manufacturing of telephone equipment. It is planned to discard, even sooner, restrictive provisions of the U-2 Order and the other U limitations and control mandates which have been found to be unnecessary because the WPB Division has virtually shelved these provisions in their authorizations of resumed

manufacture and installation of telephone equipment for civilian use.

Relax Controls of Central Office Equipment

IN regard to U-2, the revisions now under study and likely to be adopted by the WPB top leadership will greatly aid in increased installation of central office equipment and dial PBX switchboards and systems. The telephone companies also will have a freer hand in measuring the capacity of their respective exchanges and the WPB is slated to remove the present revision of central exchanges being engineered to 105 percent capacity.

The WPB Communications Division has been sanctioning additions for central office exchange equipment during the past few months with much greater liberality than before. This course of action was due to the fact that central office facilities have been just as bad a bottleneck, if not even more serious, than the shortage of telephone instruments in filling essential civilian needs.

Since the revision of the U-2 Order, establishing B and C Schedules of users, the number of appeals has been materially reduced. More responsibility has been placed upon the telephone companies in granting telephone service applicaions. However, the Communications Division has been granting a much smaller ratio of the appeals for telephone service under the revised set-up of U-2 than in the past.

Highly successful results accrued from the Bell System program which called upon business firms for voluntary surrender of extension telephones and the prevention of additional telephone installations through the re-engineering of their facilities. Some of the larger Independents participated in this program under which telephone company commercial staff experts advised business establishments concerning the more efficient use of their own telephone facilities. Since the program started on June 16 and up to August 15, the telephone industry reported to the WPB that approximately 42,000 extension telephones had been surrendered by business firms voluntarily and disconnected and as a result of re-engineering some 14,000 extensions phones which had been requested by businesses were not installed—or a total savings of over 56,000 telephones.

Closing Army Posts

A PLAN for the orderly conservation of communications facilities, materials and personnel in the future closings of Army camps, posts, depots, arsenals and other establishments in the continental United States is now in

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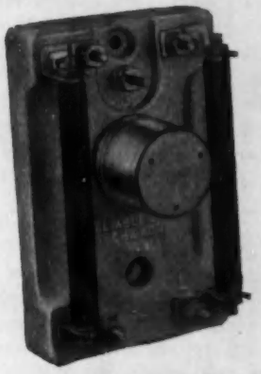
Ask for catalog showing complete line of time-saving forms and business-building stationery.



No. 955 STATION PROTECTORS

Listed as Standard by the Underwriters' Laboratories

The Reliable No. 955 INDIVIDUAL STATION PROTECTOR has all the features of the well-known line of RELIABLE PROTECTORS which have made them the standard of independent operating companies and railroads. This protector is of one piece design which simplifies mounting and eliminates any need for asbestos mats. The protector is neat and compact with connections easily accessible.

Made with special, low absorption porcelain base, phosphor bronze fuse clips and discharge block springs, and heavy binding posts with studs treated to prevent season cracking. Equipped with Reliable self-cleaning sawtooth discharge blocks and carbons which drain minor static discharges without leaving a ground on the line.

The No. 955 is equipped with two No. 55 seven ampere fuses.

The No. 955-A has clips which bite into the fuse tips and is equipped with two No. 77 seven ampere fuses.

Other fuse capacities are supplied on these protectors when specified.

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operation between the Army Communications Service of the Signal Corps and the commercial communications groups—the American Telephone & Telegraph Co. and Bell System, Western Union and the Independent telephone industry. The plan to effect the orderly coordination of communications operations in the case of discontinued Army establishments was formulated through arrangements effected by the Army Service Forces and the Army Communications Service, headed by Brigadier General Frank E. Stoner. The Bell System and Independent industry are advised in advance of the closing of any camps and posts by the Army.

Labor Union

THE National Federation of Telephone Workers, the independent union, which is dominant in the telephone industry, is planning a drive to organize the employees of the Independent telephone field particularly the larger companies affiliated with holding groups.

By representations to the War Labor Board and the Wage-Hour Division of the Department of Labor, the NFTW is seeking to stimulate the interest of the employees of the Independent industry in its union organization by trying to depict the wage scales of the Independent industry as below that of the Bell System. In a recent letter to Chairman Davis of the National War Labor Board seeking to have the "Little Steel" formula modified with an upward revision of wages, the NFTW claimed that the telephone industry's wage levels were much below those of other industries and this was especially so in connection with the pay scales of operators.

Three Independent telephone companies were also assailed by the NFTW in a statement of opposition to the issuance of learners' certificates by the Wage-Hour Administration. The NFTW in its statement to Wage-Hour Administrator L. Metcalfe Walling opposed the applications for such certificates which had been made by the Commonwealth Telephone Co., the Illinois Commercial Telephone Co. and the Pike County, Ill. Telephone Co.

The telephone labor organization felt that the exemption for sub-minimum wages for learner operators was designed to grant relief to the smaller Independents and should not apply to the larger companies. It was pointed out by the NFTW that both the Commonwealth Telephone Co. and the Illinois Commercial Co. had paid dividends to their parent company, the General Telephone Corporation, for a number of years without a break and had good financial positions. It also cited that the wages for operators in the Independent industry created "an abnormal spread" between the pay levels of the Bell System and Independent companies. It was understood that about 80 learner certificate applications were involved in this case. So far, Administrator Walling has not rendered a decision.

A Chuckle

It was still the "Wild West" to the woman who telephoned from Pittsburgh to Denver police headquarters and asked the police to deliver an important message to a person in Cheyenne, Wyo.

"But that's a hundred miles from here, lady—why don't you telephone to Wyoming yourself?" commented the officer who answered the call.

He's still flabbergasted over the woman's reply.

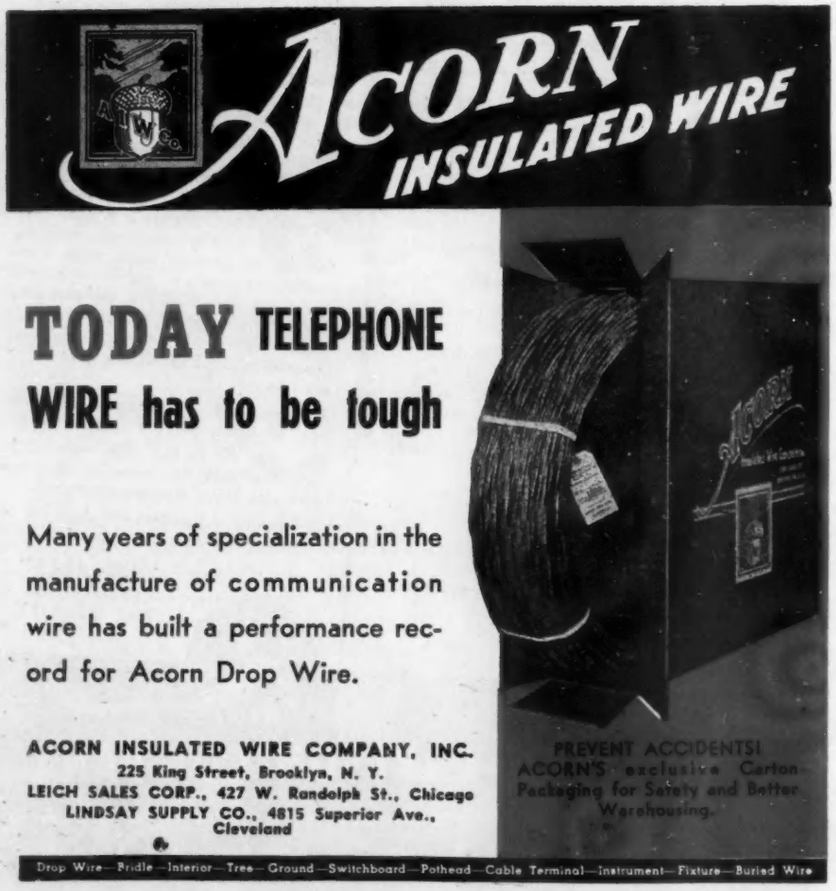
"But I didn't know there were any telephones in Wyoming!"

With more than 40,000 telephones, Wyoming hasn't had to depend on Indian smoke signals and the pony express for quite some time

New York Telephone Co. Wins Accounting Suit

IN view of the fact that the accounting entries of the payments by the New York Telephone Co. to the American Telephone & Telegraph Co. between 1925 and 1928 for toll plant and telephone instruments had been made in accordance with the system of the Interstate Commerce Commission, the three-judge Federal statutory court for the Southern District of New York ruled that the Federal Communications Commission cannot apply "retroactively a new system" to write down the surplus of the New York Telephone Co.

The motion of the FCC for a summary judgment to direct the New York Telephone Co. to make the accounting changes concerning the payments for the toll plant and telephone instruments and to reduce its surplus by the alleged excess amount of its payments to the A. T. & T. over the amount found to represent the net book cost of the toll plant and instruments on the books of the A. T. & T. at the time of the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purchase was also denied by the three-judge court. The Court which rendered its decision unanimously was composed of Circuit Judge Swan and District Judges Clancy and Bright.

"There has been no determination whether the difference between original cost and the price claimed to have been paid," the Court decision stated, "is a true increment of value, unless it is the arbitrary determination that it cannot be because it is a result of a transaction between a parent and an affiliate. There might be some real doubt to make such an interpretation if based upon any such theory."

The FCC's order proceeds upon the theory, the Court's opinion continued, that the New York Telephone Co.'s accounting was improper when made and should be corrected. "In our opinion the entries made at the time of the four transactions in question accorded with the system prescribed by the Interstate Commerce Commission," the decision cited. "They were recorded at 'actual money costs' and we do not understand that the fairness of the appraisals then made is questioned. Defendants'(U. S. and FCC) position is that the fairness of the appraisals is immaterial because in transactions between affiliates the transferee is bound to take the transferor's net book costs. But if the entries were correct when made, as we now determine, the defendant Commission, under the present record, cannot apply retroactively a new system to write down the plaintiff's surplus."

The stipulation in the 1936 decision of the U. S. Supreme Court on the administrative construction powers of the FCC formed the major foundation of the statutory court's ruling in favor of the New York Telephone Co. The administrative construction, if nothing else, under the Supreme Court's ruling, was held in this current decision to preclude the FCC's action against the New York Telephone Co. until (1) there has been "a fair consideration of all the circumstances" and (2) unless the difference between the original and present cost is not "a true increment of value" but is a "fictitious or paper increment"; and action to obliterate must depend on "evidentiary circumstances" later to be developed.

END

Communications Excise Collections

Communications excise collections for the 1944 fiscal year ended June 30, amounted to $141,275,266, for telephone, telegraph, radio and cable messages, as compared with $91,174,496 in the comparative period of 1943.

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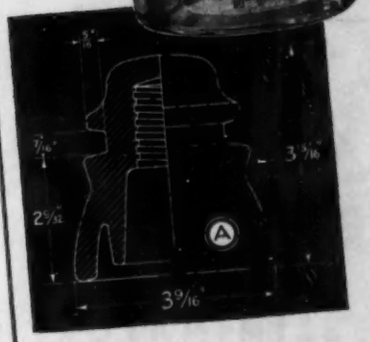
Tests show that transverse strength exceeds that of supporting pins.



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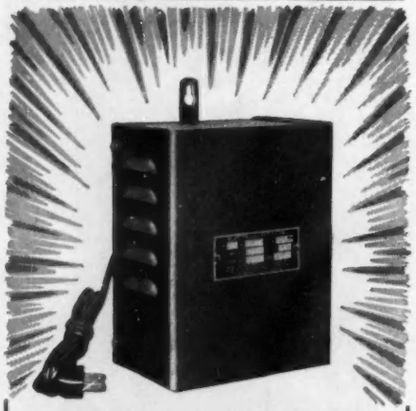

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Presented Life Memberships in Telephone Pioneers of America

During a recent conference of district managers of Indiana Associated Telephone Corporation and department heads of the East Central Group of General Telephone Corporation, F. O. Cuppy and W. R. Brown, both of whom were retired July 1, 1944, were called in to receive the plaudits of their former fellow workers at the presentation made to them by F. E. Williams, toll wire chief, of the Indiana Bell Telephone Company, of life memberships in the Telephone Pioneers of America.

Those at the presentation table are Mr. Williams, Mr. Brown and Mr. Cuppy. In the spectator group, standing, left to right: H. B. Walls, manager, Greencastle District; W. H. Van Horn, manager, Elkhart District; E. A. Ransdell, manager, Connersville District; C. M. Rice, manager, Logansport District; F. B. Cuppy, manager, Lafayette District; B. W. Saunders, vice president and general manager; R. P. ullivan, traffic superintendent; E. M. Blakeslee, president; W. C. Steinmetz, plant superintendent; F. M. Lantz, manager, Wabash District; William Rawson, acting manager, Angola District. Seated, left to right: C. D. D'Aoust, general auditor; E. L. Malone, manager, LaPorte District; R. T. Kieren, chief engineer; H. P. Karnes, commercial superintendent; H. W. Sauter, manager, Valparaiso District.

Mr. Cuppy, formerly president of Indiana Associated Telephone Corporation, and Mr. Brown, plant engineer, were retired from active service July 1, 1944, under the provisions of the company's Plan for Employees' Pensions. Mr. Cuppy continues to serve the Corporation as a member of its Board of Directors and as Chairman of the Board. At date of retirement, Mr. Cuppy had served the corporation and its predecessor forty-one years and ten months, while Mr. Brown's record of continuous service was forty years and ten months.

* * *

Receives Approval To Purchase Independent Exchange

The Jamestown (N. Y.) Telephone Corporation during August received the approval of the New York Public Service Commission to acquire all the outstanding stock of a small Independent, the Ashville & Panama Telephone & Telegraph Corp. so as to merge its operating facilities into its own system. The Jamestown company will purchase the 245 shares of the smaller company's stock at $120 a share. The Ashville & Panama Co. operates in the contiguous territory west of Jamestown's territory and has stations in exchanges.

Minnesota Association Seeks Test of OPA Power on Rates

A test case of a small Independent telephone company to obtain a rate increase of $3,000 a year to meet wage boosts has been brought before the Minnesota Railroad and Warehouse Commission by the Minnesota Telephone Association and the OPA Public Utilities Division is intervening to determine whether or not small Independents can obtain boosts in their telephone subscriber rates.

No date has been set by the Minnesota commissions for the hearings. The company, the Kasson and Mantorville Telephone Co., only operates around 400 stations in two villages. The Minnesota Telephone Association is aiming its participation in the case to obtain a precedent under which other small Independents can secure similar relief from higher wage costs.

In Illinois before that state's Commerce Commission another large Independent, the Illinois Allied Telephone Co., a Class B company, is seeking an increase of some $20,000 to meet wage increases and the OPA will intervene on the grounds that the wage increase can be absorbed by the company. This case was up for a further hearing Sept. 13.

The OPA Public Utilities Division will also intervene before the Illinois Commerce Commission in the case of the Mason City Telephone Company (Independent) on September 19. This is a second hearing, set for Sept. 19, and is to take up a company valuation study which had been requested by the OPA Division.

In another state, Ohio, the OPA unit has been granted leave to intervene in the proceeding on the application of the United Telephone Co. for a rate increase at its Bellefontaine, O., exchange. The Ohio commission has not as yet fixed a date for hearings.

Commission Eliminates Assumed Depreciation Reserve Earnings Rate

The Missouri Public Service Commission has just amended its order on earnings of depreciation reserves of the Southwestern Bell and other major utilities in its state to eliminate the 5½ percent figure of its original order, which assumed earnings on the depreciation of funds at that rate.

The Southwestern Bell and the other utilities were directed to file before October 2 statements on the income from their depreciation reserves and on their rate of depreciation accrual. One of the five Missouri Commissioners, Mrs. Agnes May Wilson, dissented

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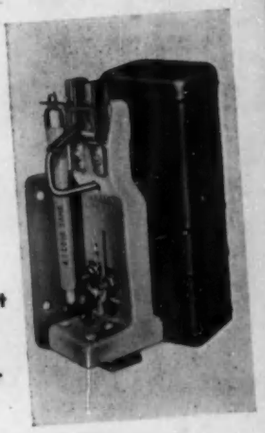
Single Circuit Protectors for Indoor and Outdoor Use



The Type "O" single circuit protector with one pair of fuses and one pair of high potential dischargers is unexcelled for both indoor and outdoor use.

The sturdy body of the Type "O" is a single piece of heavy white glazed, low absorbent porcelain, designed to prevent surface leakage. Phosphor bronze fuse and lightning arrester clips are securely fastened to the body by Everdur bolts.

The Type "O" Sub-Station Protector is made for various types and lengths of fuses. Fuses are 5 amperes and blow at rating. When specified, either higher or lower rating will be furnished.

Type "O" Protectors have a round hole in the porcelain base for small size lead-covered, rubber-insulated cable for underground distribution, or where circuits pass under railroads, roadways, etc.

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from the order on the ground that it was contrary to the FCC system of Uniform Accounts for Telephone Companies and the Federal Power Commission Uniform System.

In the revised order, the utilities are directed to show a statement of the actual rate of earnings on their depreciation reserve and were instructed not to charge as operating expenses amounts corresponding to these earnings. The revised order takes the place of the original order and was modified after conferences between the Commission and the utilities.

Hotels Are Subscribers, Not Agents—Courts Declare

Hotels are not agents of telephone companies but were classified as subscribers by U. S. District Judge Brennan of the Southern District of New York in a decision, released Sept. 6, in which he upheld the validity of the tariffs on hotel surcharges filed by the American Telephone & Telegraph Co. and the Associated Bell System companies with the FCC. This was the second ruling by a Federal Court on the issue of hotels imposing surcharges in addition to the regular telephone toll rates to be paid by their guests—the Federal District Court in Washington had likewise upheld the banning of such surcharges.

The tariffs of the telephone companies were held to be valid by Judge Brennan in upholding the FFC position despite the contentions of the hotels that they were not effective because of no 30-day regular notice. The New York case involved about a score of hotels in that city, the A. T. & T. and the New York Telephone Co.

The opinion of Judge Brennan in regard to the issuance of an injunction to stop the surcharges was somewhat obscure as to whether he directed his order against the telephone companies to prevent them from furnishing toll service to hotels continuing surcharges or against the hotels themselves. In Washington, Justice O'Donoghue had imposed the injunction against the hotels; this case is now being appealed to the higher Federal courts.

Utah Commission Reopens Intrastate Toll Rate Probe

The Mountain States Telephone and Telephone Company and the Independent telephone companies in Utah have been ordered to file answers by September 30 in the reopened investigation of the Utah commission, proposing to reduce intrastate toll rates of over 16 miles distance to the level of the interstate Long Lines charges and to discontinue the report charges in intrastate toll calls. A hearing date is to be set later by the Utah commission.

The toll rate inquiry reopened the original investigation of the Utah commission which was launched in Sept., 1942. The commission's order to reduce the intrastate toll rates was set aside by the State Supreme Court on Oct. 24, 1943, after an appeal by the Mountain States company and the commission last March 17 was denied a rehearing.

FCC Changes Requirements For Employee Classification

The Federal Communications Commission has revised Part 51 of its Rules and Regulations which cover classification of telephone employees. Companies reporting on Annual Report Form M in the future will be required to classify employees into various occupational groups and sub-groups set up on the basis of hourly rather than weekly wage rates. The new requirement eliminates classification of employees by sex for each wage rate bracket. The FCC stated that these changes will "substantially relieve the telephone companies of the burden of making special reports and surveys for other government agencies".

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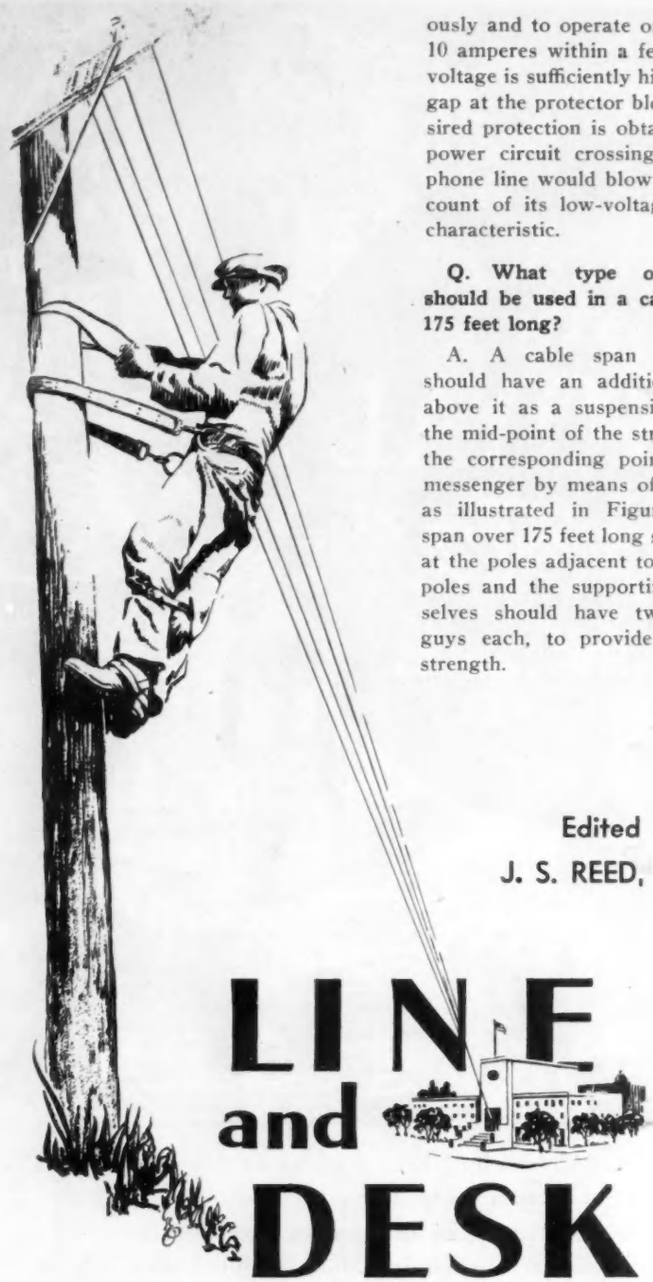

Edited
J. S. REED, JR.

LINE and DESK

Q. Why are 7-ampere fuses employed in substation protectors, rather than 5-ampere or 10-ampere fuses?

A. The reason for the 7-ampere value is that the majority of the high voltage series lighting circuits in this country make use of a constant current of 6.6 amperes. One characteristic of this system is that if it is opened at any one point its voltage will rise to a dangerously high figure. If a cross between the lighting system and a telephone line were to occur and the protector fuses operated, the voltage would immediately rise and the city lighting current would arc over, resulting in a fire. To avoid this danger, the fuse is designed to pass 7 amperes continuously and to operate on approximately 10 amperes within a few minutes. The voltage is sufficiently high to bridge the gap at the protector blocks and the desired protection is obtained. A regular power circuit crossing with the telephone line would blow the fuse on account of its low-voltage high current characteristic.

Q. What type of construction should be used in a cable span about 175 feet long?

A. A cable span of this length should have an additional messenger above it as a suspension strand with the mid-point of the strand fastened to the corresponding point of the cable messenger by means of a 3-bolt clamp as illustrated in Figure 2. A cable span over 175 feet long should be guyed at the poles adjacent to the supporting poles and the supporting poles themselves should have two side anchor guys each, to provide the necessary strength.

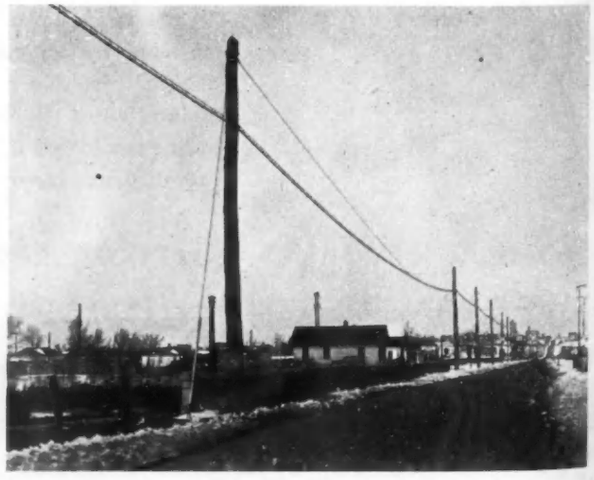

Figure 2—A typical Suspension Construction for Long Cable Spans.

Q. When is it economical to use phantom circuits on a rural wire lead? What are the advantages and disadvantages of phantoming?

A. Phantom circuits can be utilized on wire lines of over four miles in length with resulting economy. Since one extra circuit is obtained for every two physical circuits, savings in the use of wire and pole hardware result. Against this must be balanced the expense of installing repeating coils and protective equipment, in addition to the increased cost resulting from the cutting in of special transpositions to minimize crosstalk and power induction interference. Phantom circuits are more susceptive to this type of interference than physical circuits. The repeating coils introduce a transmission loss of .5 DB per coil, are a little difficult to ring through, and will not test through from the central office. However, if the line and subscriber spurs are well maintained with regard to transmission and ringing quality, these objections are not serious. For testing purposes, the repeating coils can be arranged to be cut out of the circuit by means of a special jack and patching cord arrangement.

Q. We sometimes have found it necessary to deaden the sound of a telephone bell in order that the subscriber can tell which of two telephones close together to answer when one or the other rings. Our usual method was to slit the gongs of one ringer with a hacksaw, but this ruins the gongs for regular use in case of re-installation elsewhere. What method would change the pitch of the gongs without cutting them up?

A. Try attaching a piece of one-inch adhesive tape across the cup end of one or both gongs. The tape can later be removed when the full ringing volume of the gong is desired.

Loading Spiral-4 cable on a Higgins boat for submarine laying.

Photo by U. S. Army Signal Corps

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Getting The Most Out Of Aerial Cable Plant

(Continued from page 42)

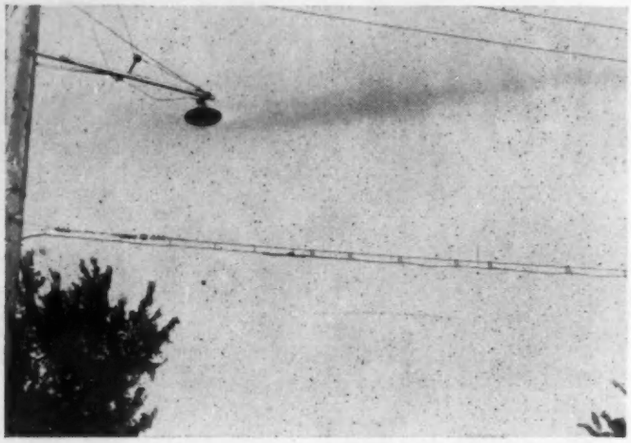

Figure 6—Effect of Irregular Ring Spacing.

followed by a maintenance crew who makes the necessary repairs as directed by the reports submitted by the inspector. A typical inspection form is shown in Figure 1.

The following defective conditions should be looked for in examining the cable plant.

(1) Bows or waves in cable denoting excessive messenger tension.
(2) Cable creeping away from corners or on grades.
(3) Missing or irregularly spaced rings.
(4) Inadequately supported sleeves.
(5) Improperly installed cable terminals.
(6) Inadequate clearances from power and light wires.
(7) Interference from tree growths.

Correcting Wrong Tension In Cable Messenger

INCORRECT tension in cable messenger occurs in one of two ways: excessively tight or excessively slack messenger.

A messenger that has been pulled too tight results in a high incidence of sheath crystallization due to the messenger strand being restricted from its normal expansion and contraction under temperature variations, causing all the movement to take place in the cable alone. This movement, commonly termed **creeping** causes excessive bowing of the cable at poles and a wavy appearance of the cable in the span as illustrated in Figures 2 and 3. This effect is most marked on cable grades and at corners, great strain being placed on the cable sheath at the top of the grade and at corners (Figure 4). Sometimes the strain is so great as to cause the lead sheath to part, exposing the conductors.

Excessively slack cable results when an anchor guy at a dead end point or corner pole "gives", a pole breaks off under the ground line, or becomes loosened by frost heaving, and throws excessive slack in one or more spans.

Ring cutting or wear occurs in slack cable spans. The cable sags down between the rings and the loose messenger swings in the wind, imparting a rolling and vibrating motion to the cable that causes the rings to dig into the lead sheath and eventually wear through it.

Slack guys should be pulled to the correct tension and loosened poles tamped firmly back in position. Broken poles are dangerous when left in this condition and should be promptly replaced. Sometimes there is insufficient

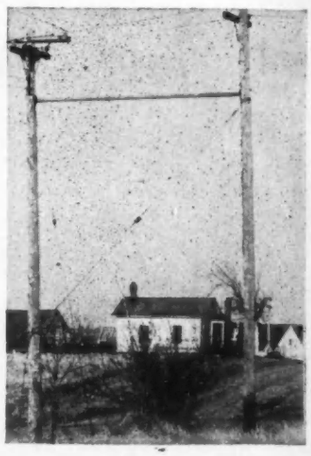

Figure 5 — Pipe Brace Arrangement at Dead End Where Anchor Cannot be Placed.

room for placing a deadend guy and a pipe brace arrangement such as the one shown in Figure 5 is necessary to prevent sagging of the cable in the last span.

Experience has shown that if the cable messenger is pulled to an optimum tension between the tight and slack conditions, cable damage is minimized though not wholly eliminated. Without the cable and supporting rings, the optimum tension of the messenger at 60° F is 1100 pounds for 6000 lb. strand and 3500 lbs. for 10,000 lb. strand. The required tension should be determined by means of a dynamometer since other methods are likely to give results that are greatly in error. With the cable in place on the messenger, it is necessary to consult sag tables to determine the amount of sag that will result in the desired messenger tension.

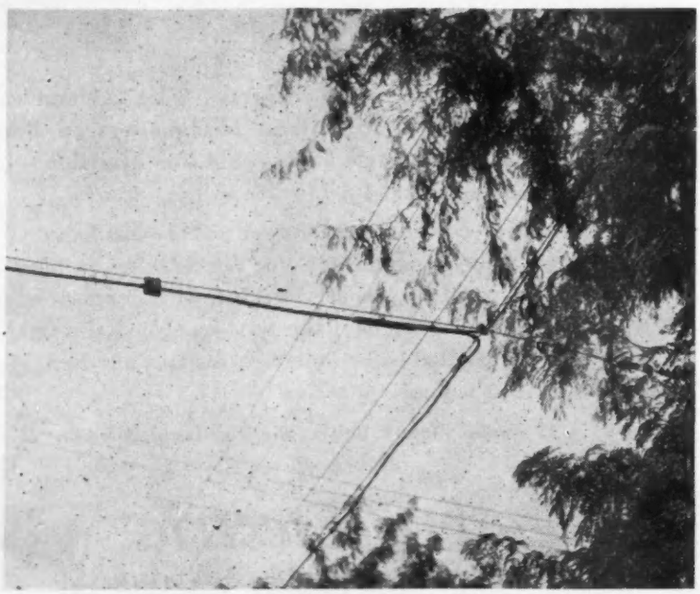

Figure 8—Use of Grade Clamp to Prevent Creeping of Cable.

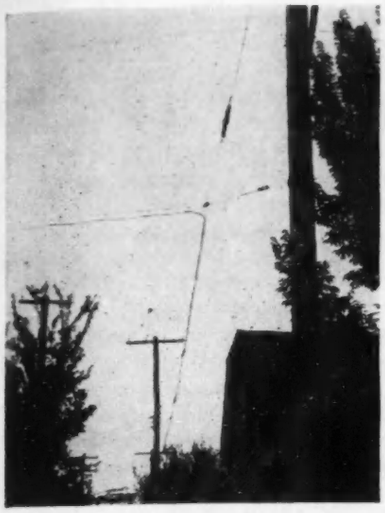

Figure 4—Cable Creeping Away from Corner.

Since the presence of cable bows at poles and waves in cable spans is a good indication of excessive messenger tension, the obvious remedy is to slacken the messenger. This calls for a rather elaborate procedure since it is necessary to place head guys at each end of the section being slackened, remove all cable bonds and attachments to the messenger except rings, lubricate the strand at suspension clamps, and move cable rings at poles in the direction of the movement of the strand before cutting in the proper length of messenger strand to give the cable messenger the requisite tension.

Sometimes slackening off the messenger will not straighten out the cable entirely. Pulling the cable to a tight corner in the lead and shaping the corner to a smooth curve may take out the slack in the cable. In extreme cases it may be necessary to pull the cable out to the nearest splice, cut out the excess, and resplice the cable.

Preventing Cable Damage Due to Improper Cable Supporting Methods

ONCE the right tension of the cable messenger has been obtained, the

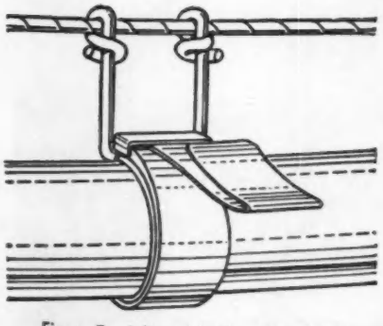

Figure 7—Adjustable Type Zinc Strap Hanger.

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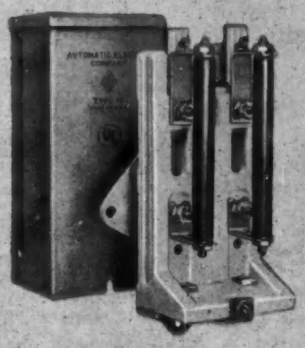

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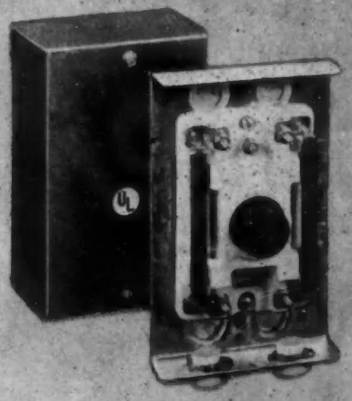

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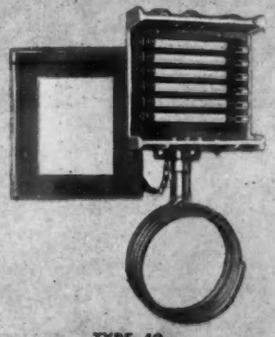

TYPE 40
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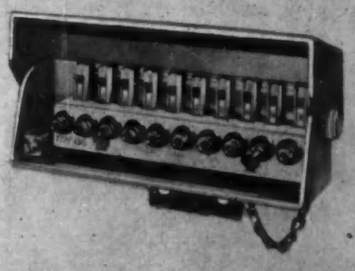
TERMINAL



TYPE 19A
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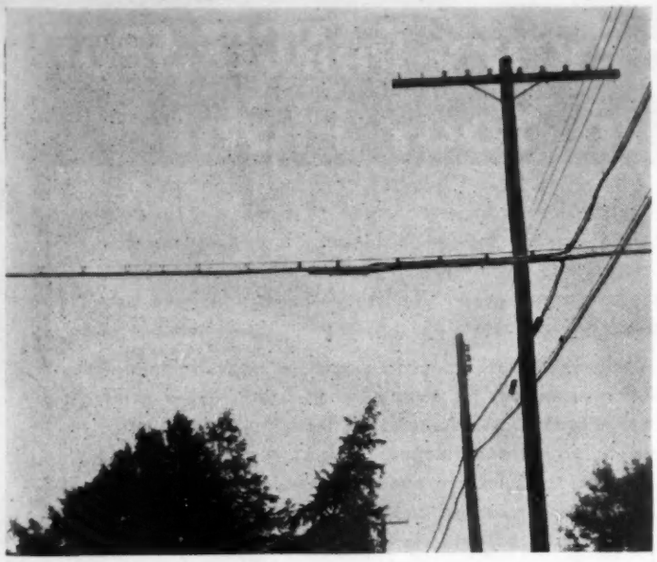

Figure 9—Use of Lashing Wire Ties to Support Branch Cable and Heavy Splice.

use of correct supporting methods is still needed to restrict the movement of the cable on the messenger.

In the case of cable supported in rings, it is important that the rings are correctly spaced. Irregularly spaced rings cause the cable to sag more in certain places than others, resulting in strain on the sheath that contributes to ring wear. This effect is shown in Figure 6. The correct spacing is 20 inches throughout the span and 10 inches on each side of the cable pole. A few companies make use of 12-inch spacing for the smaller sizes of cable.

Irregular ring spacing is often caused by three branches whipping the cable and messenger.

In addition to respacing rings and replacing missing rings, the cable should be carefully examined to make sure that each ring is bearing its share of the cable weight, since occasionally rings of the same make have been found to differ slightly in size as when new rings are used with old ones on the same support. The rings should be just small enough to prevent the cable from rolling inside and yet be easily removed without unduly squeezing the cable.

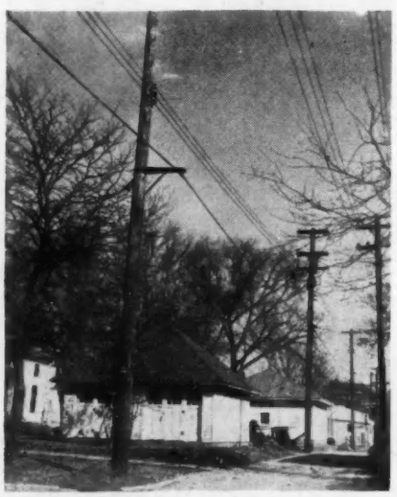

Figure 10—Cable Supported by the Spinner Method.

Zinc strap hangers at locations where cable damage due to ring cutting or wear is encountered is one economical means of preventing further damage of this kind. The hangers are usually placed in the first one to three ring positions on each side of the pole. The adjustable type illustrated in Figure 7 will enable the cable to be hung at the correct distance from the strand so that the cable will lie flat in the rings next to the strap hangers. Another zinc cable strap is the Davidson type which, we are informed, has service records up to 30 years without any report of damaged cable. Another location for the hangers is at cable corners to prevent cable from creeping away from these points. The hangers may be also used to hold light cable on moderate grades, though grade clamps should be employed on heavy cable and on steep grades, as illustrated in Figure 8.

Branch cable should be strapped or wire-lashed together to the strand as illustrated in Figure 9. Heavy sleeves should be well supported in the same manner to prevent sheath breakage at the wiped joints.

The cable suspension method using wire lashing is being successfully employed by many companies to completely eliminate cable movement on the messenger. This method, fully described in a recent booklet issued by the United States Independent Telephone Association, can be utilized in the maintenance program to eradicate many annoying cases of cable damage. Figure 10 illustrates the neat appearance of a cable lead suspended by the spinner method.

There are a number of advantages to the spinner method of suspending cable on its messenger, as follows:

(1) Prevention of excessive bowing.
(2) No rings required, which eliminates damage due to ring wear or cutting, and the formation of loops as the result of misplaced or missing rings.
(3) No grade clamps are needed to restrict cable movement on slopes.

However, good judgment must be exercised in deciding whether existing cable should be spun on the messenger or the present ring supporting method be continued. Very old cable should not be disturbed especially when its sheath is badly crystallized, but rather should be left alone until it can be replaced with new cable.

In lashing cable to the messenger by the spinner method, care must be taken not to permit cracks to develop as the result of too much tension on the cable and failure to provide zinc strap hangers at and near cable sleeves. The sleeves themselves should be lashed to the messenger by means of zinc straps at both ends to prevent twisting of the sleeves which causes breakage at the wiped joints.

Eliminating Trouble in Stub Cable at Terminals

MANY companies make use of a stub cable that runs from its connection with the main cable down the pole to the bottom of the cable ter-

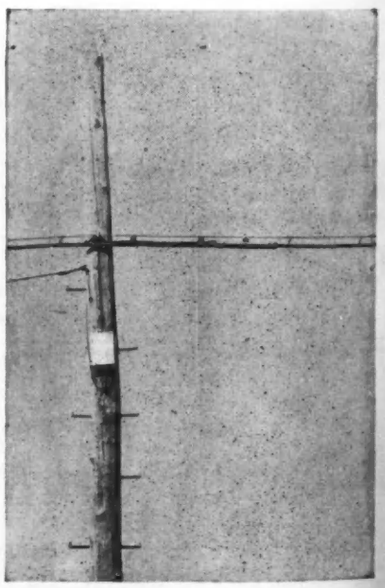

Figure 11.

How the Guard Arm is Used to Provide Climbing Space on Cable Terminal Poles.

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minal. This is not an entirely satisfactory arrangement due to the necessity for running the cable on another side of the pole than that on which the terminal is mounted in order to make the bend at the terminal. If the type of terminal permits, the cable should enter at the top, as illustrated in Figure 11, thus permitting the stub to be placed on the same side of the pole as the terminal. This arrangement prevents the cable from being gaffed by men climbing above the terminal and has the added advantage of being less subject to damage by lightning discharges from the conductors to the sheath as the result of high impedance offered to the passage of lightning by more than one bend in the cable stub.

Maintaining Proper Clearance Of Power and Light Wires From Cable

SERIOUS damage to cable may occur as the result of contact of high voltage wires with the cable. In many cases actual physical contact does not occur, but a lightning stroke from a power wire to the cable results in a power follow-up arc which does just as much damage. Maintaining the minimum clearances specified in the following table will prevent this form of damage. (See below)

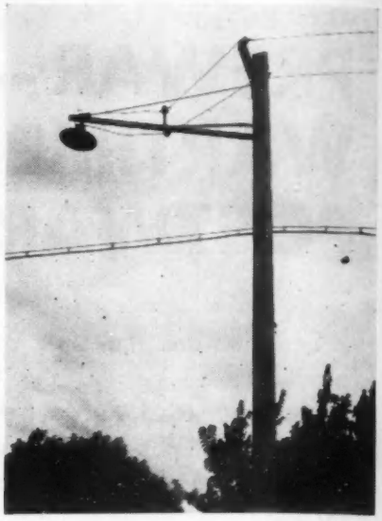

Figure 14—Street Light Bracket with Leads Brought Directly to Insulators on Bracket.

Note 1—Unless otherwise authorized, the telephone cable shall pass under supply conductors and cables.

Note 2—Occasionally it may be neces-

Minimum Vertical Clearances at Cable & Wire Crossings

Nature of Wires Crossing over Telephone Cables and Guys	Minimum Clearance from Telephone Cables & Guys	Minimum Clearance from Telephone Guys
1. Foreign communication cables, guys	2′	2′
2. Foreign communication cables and wires used with supply circuits and not of the same construction as standard communication circuits	4′	2′
3. Supply cables of all voltages with permanently grounded metal sheath or messenger (Note 1)	4′	2′
4. Open wire supply lines, supply service drops, trolley feeders and supply cable with sheath not permanently grounded (Notes 1 and 2)		
(a) 0 to 750 volts, cable below service drop	2′	2′
(b) 0 to 750 volts, cable above service drop	4′	2′
(c) 0 to 300 volts to ground (Note 3)	4′	2′
(d) 300 to 750 volts	4′	2′
(e) 750 to 8700 volts	4′	4′
(f) 8700 to 50,000 volts	6′	4′
5. Guys to supply poles	2′	2′
6. Trolley contact conductors crossing under telephone line		
(a) 0 to 7500 volts	6′	6′
(b) 0 to 750 volts, for guys and cable protected against chance of trolley pole striking them on leaving trolley contact conductor and for wires beyond reach of trolley pole in its sprung position	4′	4′

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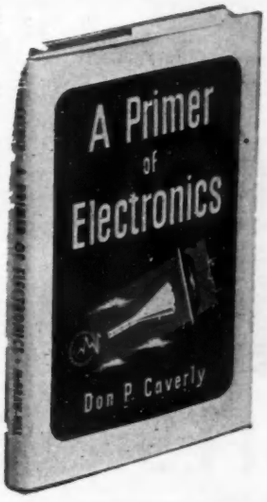

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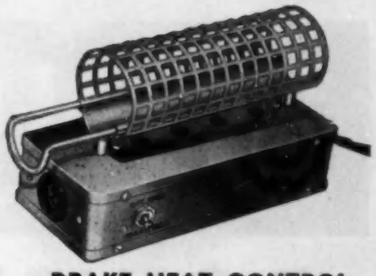

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Figure 15—Use of Cable Moulding to Protect Cable Passing Through Trees.

sary to place a "passing attachment" of telephone cable on a foreign pole in a crossing. Clearances specified in this section apply to the conductors involved in the crossing.

Note 3—Where the voltage to ground does not exceed 300 volts, neutral conductors of supply primary circuit are not involved, and the crossing is not within 6 feet of any pole, a minimum clearance of 2 feet may be permitted if the supply wires are above the telephone cable.

A guard arm is required on the cable to protect power line men from the grounded messenger and cable on jointly used poles when the clearance is less than 6 feet. In no case should the clearance with the guard arm be less than 4 feet measured between the messenger and the power wires. This is illustrated in Figure 12. The guard arm is needed on cable terminal poles in joint use construction, regardless of the amount of clearance, to provide distributing points at the ends of the arm for drop wires from the terminal and at the same time provide adequate climbing space for the power lineman. Figure 13 shows the use of the guard arm for this purpose.

When cable is carried on the same pole with high voltage street light wires, it is important that the lamp leads have sufficient clearance from the cable (at least 40 inches) or else be well insulated. Probably the most satisfactory type of street lamp bracket from the

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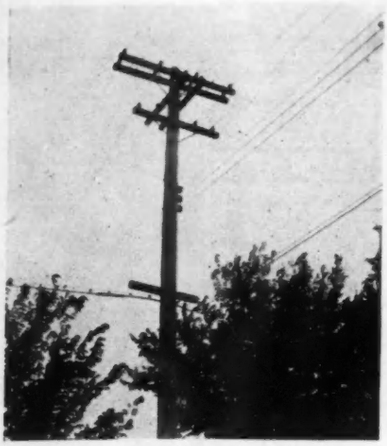


Figure 12—Use of Guard Arm Above Cable on Jointly Used Pole.

viewpoint of adequate lead clearance is that illustrated in Figure 14 in which lamp leads are brought directly to insulators on the lamp bracket well away from the cable. The bracket itself should not be closer than 12 inches above the cable or 24 inches below in cases where the cable must be placed above the bracket to obtain adequate ground clearance.

Preventing Tree Interference

ALTHOUGH only a small proportion of damage to cable is caused by trees or shrubbery in contact with the cable messenger, neglect of such contacts may eventually cause serious trouble. Large limbs sawing on the cable may wear away the sheath in some instances. However, a greater proportion of the damage results from contact of tree limbs with the messenger, due to the vibration set up and transmitted through the rings to the messenger, which accelerates sheath crystallization and ring damage. Often it is possible to (1) raise or lower the cable sufficiently to clear the offending limb, (2) pull the messenger away with a section of No. 6 iron wire attached to an eye bolt in a large limb, (3) raking adjacent poles a few inches unless they are jointly used poles or (4) placing cable arms on adjacent poles.

In moving cable to avoid limb contacts it is a good idea to have the cable pass under the limbs or through the center of trees where growth is relatively light. It should be remembered that the prevailing growth is upward and outward and that young trees and the soft wood varieties grow more rapidly than mature trees and the hardwood varieties.

When a two year cycle is established for tree trimming operations and it is not feasible to protect cable from tree growth by changing the position of the cable, sufficient clearance should be provided in cutting back the growth so that the growth will not reach the cable within this period. Experience is the best guide in determining the

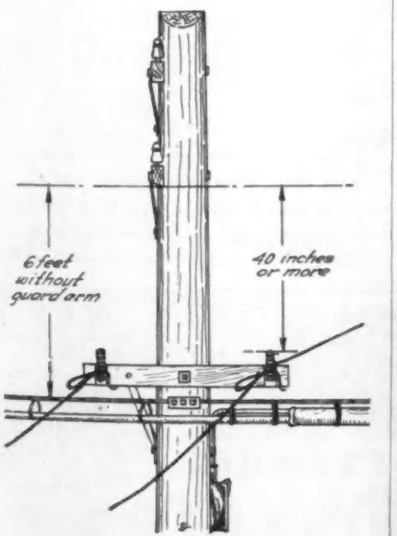


Figure 13.
Proper Method of Installing Cable Terminal.

PRESTO CHANGO!
?

It takes more than 'Sleight of Hand' or . . .
'Black Magic' to repair telephone equipment!

IT TAKES EXPERIENCE . . . plus the proper tools and the right parts to rebuild or repair telephone equipment properly and economically. The plant personnel of the TELEPHONE REPAIR & SUPPLY CO., are all experienced and skilled workmen. EIGHTEEN YEARS specializing in this type work is the reason this company is the leader in the field today.

DAN'L H. McNULTY,
President & Manager

TELEPHONE REPAIR & SUPPLY COMPANY
'Since 1926'
Rogers Park Station, Chicago 26, Illinois

HEMINGRAY INSULATORS

Favorably Known Since 1870

HEMINGRAY No. 16
Has square groove which provides substantial support for line wire.

STANDARD *of the Industry*

Hemingray Insulators have served the telephone and telegraph industry for more than seventy years.

And — in that time — they have proved their ability to give *dependable, long-life service.*

That's why leading telephone and telegraph companies have adopted Hemingrays as *standard equipment.*

Hemingrays are sold by principal jobbers and are manufactured by Owens-Illinois, Hemingray Division, Muncie, Ind.

OWENS-ILLINOIS

HEMINGRAY INSULATORS

Telephone-Telegraph

Export Agents: International Standard Electric Corporation, New York City

LARGEST SIZE CABLE THAT EACH SIZE MOULDING WILL COVER				
MOULDING	¾"	1¼"	2"	2¾"
CABLE	51-24 26-22	202-24 152-22 76-19 (CNB) 51-19 (DNB)	606-24 404-22 202-19 (CNB) 152-19 (DNB)	1212-24 909-22 455-19 (CNB) 303-19 (DNB)
Ring Sizes Used With Moulding	2"	2½"	3¼"	3½"
Length of Wire Tie	24"	36"	40"	48"

Figure 16—Method of Applying Cable Moulding to Cable.

amount of clearance to obtain at each trimming operation.

Cable moulding may be used in locations where permission to trim trees is refused or where extensive pruning would ruin valuable trees. Figure 15 illustrates the use of moulding for the protection of cable passing through trees and Figure 16 describes the method of applying the moulding to cables of various sizes. The moulding is usually obtainable in half round sections 8 ft. long which are staggered to enable overlapping at joints as shown in the illustration with the supporting cable rings spaced 24 inches apart. Four wraps of wire lashing is applied at every joint and every alternate ring to hold the moulding firmly in place. The moulding should be long enough to extend three feet beyond the farthest interfering tree limb. When cable is suspended by the "spinner" or wire lashing method, the supporting rings should be dispensed with and the spinner wire applied directly over the moulding as shown in Figure 17.

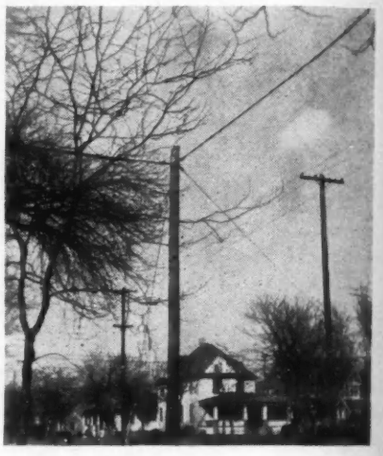


Figure 17—Cable Moulding Lashed on Cable Passing Through Trees.

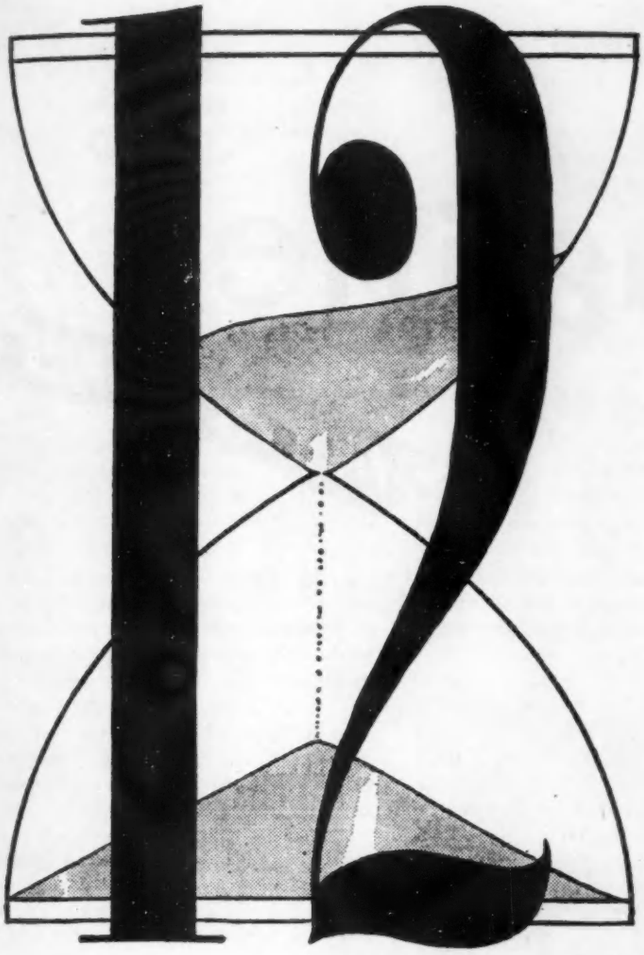
Conclusion

At the time the defective cable supporting methods are corrected, all ring cuts and sheath breaks and punctures should be repaired. Small cuts and breaks are easily repaired by means of a carbon arc soldering kit and solder, although many cable men seem to prefer the use of a blow torch for this purpose. Cable crystallized over small areas can be repaired satisfactorily by flowing wiping solder over the affected areas with a blow torch.

With the relaxing of purchase restrictions on lead covered cable, it is now possible to obtain new cable for replacement of badly crystallized cable. Except for the problem of the present man, power shortages, it should be a relatively simple matter to initiate a cable maintenance program that will eventually put the cable plant in good shape.

—END—

IF YOUR MAGAZINE IS LATE— excuse it, please! The Post Office Department asks that we be patient.



12 MONTHS

of Valuable Service to BUYERS *and* SELLERS

of equipment and supplies used in the telephone industry is the mission of the

1945 TELEPHONE "BLUE BOOK" and BUYERS' GUIDE

TO BE PUBLISHED JANUARY 15, by TELEPHONE ENGINEER & MANAGEMENT

Circulation — includes all subscribers of TELEPHONE ENGINEER & MANAGEMENT—Purchasing departments of U. S. Signal Corps, Purchasing Agents of Foreign Governments ***plus*** **EVERY telephone company in the Central and South Americas** . . . . . .

TELEPHONE COMPANIES *of the* CENTRAL and SOUTH AMERICAS *now look to* North American Manufacturers to supply their needs.

★

The 1945 TELEPHONE "BLUE BOOK" & BUYERS' GUIDE will be mailed to every telephone company in these countries.

With a ready market for available products—***plus***

A TWO BILLION DOLLAR

POST WAR MARKET (estimated expenditures to rehabilitate telephone plants after the war) MANUFACTURERS and SUPPLIERS serving this huge market should maintain healthy sales contacts.

For information regarding advertising in this important BUYERS' GUIDE, write

TELEPHONE ENGINEER & MANAGEMENT, 7720 SHERIDAN ROAD, CHICAGO

Personalities IN THE NEWS

John P. Boylan, president of the Rochester, N. Y., Telephone Corporation, was a principle speaker at the annual meeting of the Telephone Association of Maine held at Waterville, Me., Sept. 12. Mr. Boylan was representing the National Association of which he is a vice-president and director.

●

C. H. Kendrick, owner of the Knox City (Mo.) Telephone Company, made application to the Missouri commission on August 21 for authority to sell the exchange to **Lewis C. True** and **Mabel L. True,** wife.

●

Captain Arthur Domike, Signal Corps, in civilian life Santa Monica installation supervisor of the Associated Telephone Co., Ltd., recently enjoyed a 30-day leave after overseas service of two years in both the Pacific and European war theaters. A veteran of World War I, **Captain Domike** also has a son in Navy radio school who is joining him in World War II.

●

Lt. William Richeson Faris II, son of **Harry Nelson Faris,** deceased, died August 11 following a plane crash near Moultrie, Ga. He had received his wings only a few weeks before the fatal accident. His father was for many years manager of the Kansas City branch of the Kellogg Switchboard & Supply Company. His mother, **Cecil Grace Faris,** now lives in Texas.

●

Larry Morier, vice president and sales manager of the Brown Wood Preserving Co., writes us that he has just received a letter from **Capt. Henry T. Murray,** formerly in the engineering department of the Commonwealth Telephone Co., who is in France with the Signal Corps. He told Larry that is was not unusual to see the Brown band on telephone poles right at the front.

Kelley McNish

Kelley McNish, president of the Inter-Mountain Telephone Co., Bristol, Va-Tenn., and well known in national telephone circles, was honored in the Volume 1, Number 1 issue of Inter-Mountain News which made its initial appearance during September. The new publication is well edited and beautifully presented. The dedication was written by **John E. Sexton,** able general auditor of the company. We predict a worthwhile future for this excellent magazine.

●

L. E. Hollifield has purchased the Wilcox (Nebr.) telephone exchange from **Mrs. J. E. Hancock,** who operated it since the death of her husband some two years ago.

L. M. Baker has been made acting district manager of the Frederick district of the Southwest and the Southwestern States Telephone Companies in Texas.

●

C. B. Morton recently took over the Hymera (Ind.) Telephone Company and is now operating it as president and manager.

●

Harold Jester, son of **Lon J. Jester,** formerly with the sales department of Leich Sales Corporation, and now studying meteorology with the Army Air Forces in Birmingham, Alabama, visited with your editor during his furlough in August.

●

Ross Allen, owner and operator of the Lynch, Nebr. telephone exchange, recently purchased at a tax foreclosure sale the Verdel, Nebr. telephone exchange, formerly owned by **Ed Furguson.** We are informed the back taxes amounted to $1,015.32 and the purchase price was $100.

●

E. A. (Gene) Reinke of the Stromberg-Carlson Company dug into his memory book for pictures to illustrate the article on the history of the company carried in the Stromberg-Carlson "Speaker" of August, 1944. The issue celebrated the 50th anniversary of that company.

●

Lieut. John W. Graybill, 21, U. S. Army Air Forces, son of **Kenneth W. Graybill,** chief engineer of Automatic Electric Company and president of Automatic Electric Laboratories Inc., died August 19 from injuries sustained in a plane crash the preceding day. He was stationed at Greenville, Miss., and was serving as an instructor at the time of the fatal crash.

Roland C. Davies, editor of Telecommunications Reports and our Washington correspondent, will attend the October convention of the United States Independent Telephone Association to be held Occtober 10, 11 and 12.

●

H. S. Poage, R. A. Maybury, J. N. Johnson, L. O. Evenson, and **D. H. Lloyd** were named members of the executive committee of the Kentucky Independent Telephone Association, following a meeting of the board held in Lexington last month.

●

Adrian Hirdes, 72, vice president of the Allendale (Mich.) Telephone Company, died during August. He had been connected with the telephone company for many years.

●

Robert L. Andrews, founder of the Columbia Telephone Co., Hudson, New York, later absorbed by the New York Telephone Company, died from a heart attack on August 12.

●

Glen Brennecke has purchased the Urmaoga Telephone Company, Ursa, Illinois, from **Mrs. Charles Brasel,** who operated the exchange since her husband passed away three years ago.

●

Chester I. Barnard, president of the New Jersey Bell Telephone Co., was presented an award by the Navy for his services as senior civilian member of the Manpower Survey committee of the Third Naval District by **Rear Adm. W. R. Monroe. Mr. Barnard** is also national president of the U.S.O.

●

Leon Roberts, commercial superintendent of the Jamestown (N. Y.) Telephone Corp., and **Cliff C. Pearce,** manager of The Farmers Telephone Co. at Riceville, Iowa, are both distributing the **Elmer Wheeler** pamphlet entitled "Take An Hour To Say NO". It was coincidental that copies were received from both of these gentlemen at about the same time. The pamphlet is one that any telephone company in our country could make much use of. Published by Prentice-Hall, Inc., 70 Fifth Avenue, New York 11.

●

Col. S. W. Stanley, Signal Officer of the 9th Service Command, made the presentation of the Certificate of Appreciation of the Chief Signal Officer to the California Independent Telephone Association at the City Hall of Santa Monica on August 14. **C. F. Mason,** chieftain of the California group, accepted the certificate on behalf of the association members.

Fritz Kreisler, who for years had refused appeals for him to perform on the air waves, gave his first radio broadcast over the "Telephone Hour" of the Bell System, July 18, which is broadcast every Monday night over the NBC network. He will appear three more times on the "Telephone Hour", it was announced.

●

Charles A. Powel, manager of Headquarters Engineering of the Westinghouse Electric and Manufacturing Company, was elected president of the American Institute of Electrical Engineers for the year beginning August, 1944.

●

Ernest K. Gann, son of **George K. Gann,** is the author of the new book, "Island in the Sky". **Mr. Gann** is a captain in the Air Transport Command.

●

Harry J. Billica of the Copperweld Steel Company is again officing in Washington, D. C. Harry is well known throughout the entire Independent telephone industry.

●

Sam Krupnick, advertising agent for the McCabe-Powers Auto Body Co., St. Louis, Mo., has formed the new agency, Krupnick & Associates.

Sturgis

WOOD OPERATOR CHAIRS

No. 222-FR

1. Form fitting back and deep, saddle seat upholstered in genuine leather over curled hair pads.
2. Easy, "floating" swivel mechanism.
3. Available in 4 seat height ranges: 18 to 22"; 21 to 25"; 24 to 28" and 28 to 32".
4. Solid maple frame with all joints glued and dowelled.
5. Wide choice of leathers and finishes.

Sold by Telephone Supply Houses
Manufactured by

STURGIS
POSTURE CHAIR COMPANY
Sturgis, Michigan

Pheidippides

the Marathon Runner
would not have been the forerunner of today's great athletic events,

IF,

his message of "Rejoice We Conquer" could have been carried to his countrymen over *LongLife* Drop Wire.

This famous Whitney Blake product is carrying just as important messages today, MOST SATISFACTORILY.

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WB

THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

LENZ RECEIVER CORDS
LOOK FOR
LENZ
THIS MARK OF QUALITY
OUR 40TH ANNIVERSARY
Rounds out 40 years of building quality Cords, Wires and Cables and a realization of our ambition to make the best product possible.
Answering the call to fulfill today's severest problems paves the way to serve you with better products tomorrow.
Sturdy tinsel conductors having moisture-proof insulation finished with extra strong outer braid produces a Receiver Cord of longer life combined with trouble-free service. Write today for your copy of the LENZ Cord Chart listing all types of Cords for your convenience.
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"IN BUSINESS SINCE 1904"

Telephone Engineer

HANDBOOK TABLES

Tree Trimming Data—Characteristics of Tree Species

Index—Outside Plant Maintenance
Date—September 15, 1944

Species (Common Name)	Avg. Annual Terminal Growth* Rate in Ft.	Approx. Mature Height in Ft.	Comparative Wood Strength Values (Green)† lb. per sq. in.	Suggestions
Upright Growth Form				
Cottonwood (Carolina poplar)‡	4.30	85	5,300	Can do any type of trimming. Avoid overbuilding.
Elm (American)	2.14	85	7,200	Avoid overbuilding. Can top notch. Best underbuilt.
Gum (Sweet)	0.66	100	6,800	Slow growing. Can be topped. Best side trimmed or underbuilt.
Hickory	0.96	65	11,000	Top, side or under trim. Slow growing tough wood.
Kentucky Coffee	0.90	80	Unknown	Hard, strong wood. Can be topped. Best underbuilt.
Locust (Honey)	1.50	80	10,200	Avoid if possible. Should be underbuilt.
Maple (Silver)	2.14	75	5,800	Vigorous sucker growth when topped too heavily.
Oak (Pin)	2.00	70	8,300	Strong hardwood. Do not top.
Poplar (Lombardy)‡	3.63	80	Unknown	Avoid or remove. Soft, brashy wood.
Sycamore (American)	1.50	75	6,500	Vigorous sucker growth when topped. Best to underbuild.

*Approximately normal average rates for Central Western States—subject to variation due to soil, moisture, and site conditions. As pruning stimulates growth, these values should be approximately tripled to arrive at first year growth rate of topped trees.
†U. S. Govt. standard test for modulus of rupture, static bending of a simple beam (Technical Bull. No. 479).
‡Remove if possible.
Data furnished by courtesy of Edison Electric Institute (Publication K-10).

In maintaining clearance of open wire lines and cable leads from tree growths, a knowledge of growth and strength characteristics and the proper method of pruning each tree species will be found helpful. An understanding of the average growth rate will help determine how much pruning a tree should receive to prevent growth contact with the conductors or cable within tree trimming cycle (usually two years). The strength characteristics of a tree species determines whether it is safe to allow the trees to grow close to or over a telephone lead, since structurally weak trees may topple over onto the line in storms or branches may break off these trees to fall on the line.

The table at the left lists the most common tree varieties found throughout much of the United States, grouped according to their general tree form; upright, spreading, and horizontal. Conifer species are not listed; since, with the exception of red and white cedar and hemlock, they do not lend themselves well to topping.

North Dakota Commission Authorizes Purchase By Central Telephone Co.

The North Dakota Public Service Commission August 26 approved the purchase of the properties in that state by the Central Electric & Telephone Co. to the newly organized Central Telephone Company through the issuance of bonds by the latter to facilitate the transfer.

The Central Electric & Telephone Co. operates 12 Independent exchanges in North Dakota. They are at Bathgate, Cando, Cavalier, Devils Lake, Langdon, Medina, Neche, New Rockford, Sherwood, Towner, Westhope, and Webster.

Tennessee Commissioner Would Boost A. T. & T. Assessment

An increase of $2,000,000 in the 1944-45 tentative assessment, formulated by the Tennessee Railroad and Public Utilities Commission against the properties in that state of the American Telephone & Telegraph Long Lines Department was advocated by Commissioner Jourolomon in a dissenting opinion.

The Commission had fixed a tentative assessment of $6,000,000. Commission Chairman Porter Dunlap pointed out that this was $3,000,000 above the previous assessment, but in his dissenting opinion Commissioner Jourolomon declared that the A. T. & T. has "escaped in the past adequate ad valorem taxation in Tennessee." He cited that the A. T. & T., for example, owns and operates a toll exchange at Memphis and many of the interstate toll lines in the state.

New Acro Miniac Snap-Switch

Reported to be the smallest fully enclosed snap-action switch ever built, the new Miniac is only 17/64" thick, 13/16" high, and 1 3/16" long. Engineered on the well-known rolling spring principle, but with a new design and smaller size. Fully enclosed in a bakelite case with 4 mounting holes 3/32" diam. Actuation is with a stainless steel pin plunger. All parts are non-corrosive and all contacts are of fine silver. Main blade, contact blade, and rolling spring made of beryllium copper. Rated at 15 amps., 115 volts A. C. Furnished in single pole, normally open and normally closed, double throw. Designed to permit leaf type or overtravel plunger type actuators to be attached to the case. Manufactured by the Acro Electric Company, 1368 Superior Avenue, Cleveland 14, Ohio. Please mention this magazine when requesting additional information.

Boost Phone Rates

The Staunton (Ill.) Telephone Company has been authorized by the Illinois commerce commission to increase rates in Staunton, Williamson, and Livingston.

Roy Owens of Automatic Electric Moves to Chicago

Roy Owens, veteran engineer and sales representative of the Automatic Electric Company since 1902, is being transferred from the post of special representative of the company in Washington which he has held since Jan., 1943, back to the Chicago headquarters to become a key member of the general manager's staff. He is reporting on his new assignment October 1 in Chicago.

Mr. Owens, who has been very well

SOLVE

Ringing problems of Selective Party Lines

The Holtzer-Cabot alternating-current motor-driven multi-frequency set is designed for supplying suitable frequencies of alternating current for selective party lines. Simple and foolproof, these machines give long-lived performance with minimum attention and maintenance. They are available in 50 and 150 watt outputs. Four frequency generators have an output of 16.6, 33.3, 50.0, 66.6 cycles at 75, 100, 135, and 175 volts respectively. Five frequency generators are the same as above with the addition of 25.0 cycles.

Investigate Holtzer-Cabot telephone ringing equipment for your exchanges. It has the unqualified approval of the engineering and service departments of all major telephone companies. Bulletin 1310-02 gives the complete Holtzer-Cabot story.

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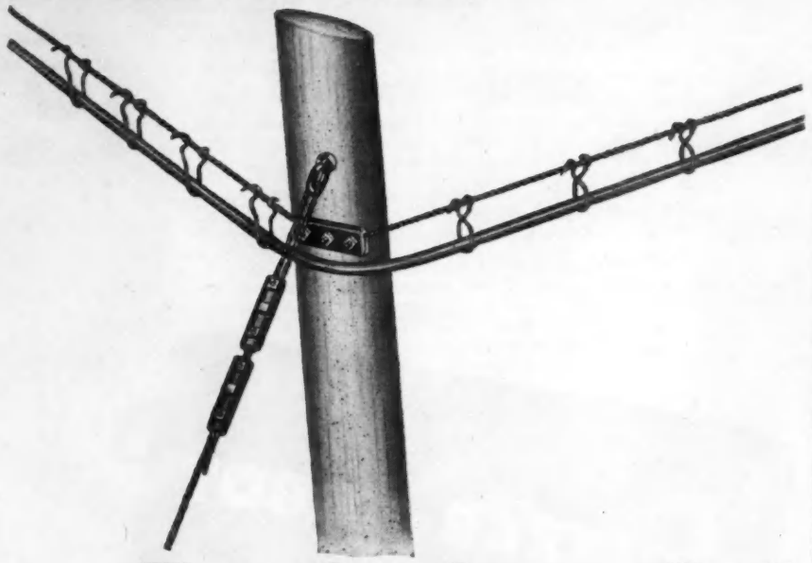
Amerstrand–



For the Long Pull

When you've used Amerstrand for your messages and guys, your plant is built "once and for all." Telephone men who regularly use this strand are agreed that it offers all the qualities demanded for sound engineering and lasting construction.

Rigidly controlled production, from iron ore to finished product, assures exactly the correct combination of characteristics for each specific purpose. And Amerstrand is made in a wide range of grades and sizes, from which you can select the proper strand for any job. Thus, it permits rigid control of initial and replacement costs for any installation.

For the present, Amerstrand is available only for absolutely essential construction. But when you do need steel strand, order from Automatic Electric—get Amerstrand quality and long life.

USS Amerstrand STEEL STRAND MADE BY AMERICAN STEEL & WIRE COMPANY

DISTRIBUTED BY

AUTOMATIC ELECTRIC SALES CORPORATION

1033 WEST VAN BUREN STREET • CHICAGO 7, ILLINOIS

Roy Owens

liked by the Washington governmental agencies which he has contacted during the past 20 months, was the guest of honor at a dinner Sept. 1, given by his acquaintances in the capital. It was attended by a number of leading officials of the WPB Communications Division, including Director Peebles, Assistant Director McNamara, Operating Section Chief Merrill, Manufacturing Section Chief Sloan, FCC Engineer George Dempsey and FEA Communications Division Chief Samuel Ryan.

A life member of the Telephone Pioneers of America and of the Independent Pioneer Telephone Association, Mr. Owens has been continuously with the Automatic Electric for the past 42 years in the United States and Canada, particularly as an installation and sales engineering expert in the Central West, East and Southeast. He also engaged in sales and equipment engineering activities in Cuba, England and Ireland from 1923-25. From 1939-41 he was loaned to the Bogota, Columbia Telephone Co., Ltd. as Superintendent of Operations. From 1905-12 he was superintendent of operations of the Columbus (Ohio) Citizens Telephone Co. and directed several telephone industry "firsts" while on that assignment, including the first unattended PABX at Ohio State University, experiments in dialing on toll lines and dial switching of toll lines, dialing of rural lines and ringing by code through means of a push button. Thus, the Columbus, O., automatic system was in a sense a laboratory for many of the early developments and experiments in the art of automatic telephony.

Mr. Owens was born April 17, 1877, in Chicago and graduated from the Chicago Manual Training School in 1895 and prior to coming with Automatic

Electric was four years with the Chicago Elevated Traction Co. and three years an electrician on a sugar plantation in Hawaii. From 1912-13 he was superintendent of the Operating Department of Automatic Electric. From 1923-37 he traveled out of the Chicago office of Automatic Electric for ten years; was in charge of the Columbus, O., office for two years and the Rochester, N. Y., office for two years. For the next two years he was division sales manager at the Chicago office. His major hobby is taking motion pictures and showing them to his friends and other informal gatherings.

McCullough Joins Automatic

Phillip M. McCullough

PHILLIP M. McCullough, who has been head of the Inter-American Communications Division of the Foreign Economic Administration, joined Automatic Electric Company September 1, 1944, and will handle executive matters concerning the international operations of the company at the present time and in the post war period. Mr. McCullough has been elected a vice president of International Automatic Electric Corporation, an affiliated company, which is the foreign distributor for the products of Automatic Electric Company.

Mr. McCullough has devoted his life, so far, to the communications field or to activities related thereto. Starting with the Nebraska Telephone Company in 1909 at his home in Omaha, he continued with that company, except for the period when he attended college at the University of Nebraska, where he was graduated as an electrical engineer. Mr. McCullough served with the U. S. Signal Corps during the last war, having the rank of Captain. After the war he returned to the Northwestern Bell Telephone Company where he served until 1925 in the chief engineer's office and as division plant engineer in Omaha. Leaving the Northwestern Bell Telephone Company, he went to Mexico as chief engineer of the Mexican Telephone and Telegraph Company, and at the time he left Mexico was vice president and general manager of this company.

Mr. McCullough served for several years in Europe with the General Motors Export Corporation as managing director of their Spanish subsidiary. During this time he also served in Germany, the Balkans and Western Europe.

On his return from Europe, Mr. McCullough entered the consulting engineering field, having his own office in New York City. He spent the majority of his time in communications work, having served the General Telephone Corporation, the Postal Telegraph and Cable Company and many other telecommunications organizations throughout the United States and abroad.

Mr. McCullough entered Government

They speak his language
Vacuum Grip
Pliers
EVERY lineman and electrician who uses a pair of Vacuum Grip Pliers for the first time forms an instant liking for them. And one that becomes permanent.
Experienced tool designers have put into these pliers all the features that the skilled worker recognizes and appreciates. An easy-riding joint. A comfortable non-bruising grip. Perfect balance. True cutting-blade alignment. Tremendous cutting and gripping power with little effort. Everything for making the work go faster—and easier. Pliers and diagonals that speak the user's language because they are built, not on theories, but to meet the practical needs of the day's work.
Vacuum Grips give you long service mileage. That's also important for it spells pliers economy.
Write for details of our 30-day trial plan.
FORGED STEEL PRODUCTS CO.
NEWPORT, PA.

IMPROVE PARTY LINES

ELIMINATE NOISE
with the
Improved RTC-2 VINCENT
RARE GAS RELAY
for harmonic or coded bells

Dual purpose device which economically improves both ringing and transmission on party lines.

NO MOVING PARTS.
Fully Guaranteed.
Can be installed in a minute

Write for Catalog 39-A describing
Non-Grounding Rare Gas Arresters
Terminal Strips • Potheads • Housings

L. S. BRACH Mfg. Corp.
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Signal Circuit Engineers Since 1906

service in 1941 in the Office of Production Management where he was engaged in organizing the field service of the War Production Board. This he left in 1942 to assist in the work of the Communications Division of the U. S. Commercial Company. When this division was transferred to the Foreign Economic Administration, in 1944, Mr. McCullough was made chief of the Division, serving as such until he left to join Automatic Electric Company.

Mr. McCullough makes his home in Summit, New Jersey, and will make his headquarters at the New York office of Automatic Electric Company, 21 E. 40th Street, New York City.

Exide Names Orcutt

F. F. Sampson, manager New York Branch, The Electric Storage Battery Company, Philadelphia, retired on July 1 after 30 years of service.

Daniel P. Orcutt, who has been assistant manager since 1921, succeeds Mr. Sampson as manager. Mr. Orcutt, a graduate of Denison and Cornell Universities, was in the engineering department of the Westinghouse Electric and Manufacturing Company from 1907 to 1910 at which time he joined The Electric Storage Battery Company as sales engineer of the New York Branch.

D. P. Orcutt

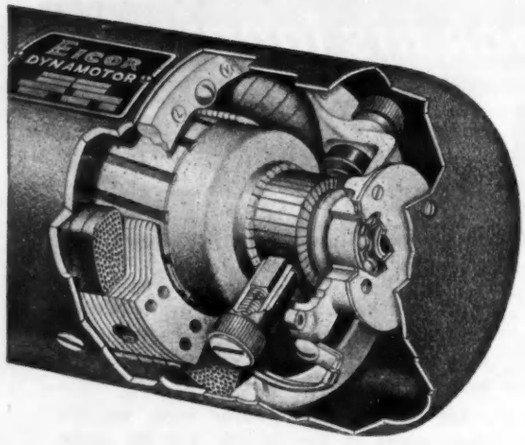
National Carbon Co. Completes Sales Plan

Completing National Carbon Company's new sales set-up under which all company products are to be handled nationally from seven divisional offices, new headquarters will be opened on Oct. 1 in New York, Pittsburgh and Chicago, it is announced. Similar offices were established a few months ago at Atlanta, Dallas, Kansas City and San Francisco.

F. W. Berdan will manage the New York division. He has been with the company since 1922 in the former "Eveready" Division and has held executive positions since 1929, for the last several years in New York. The assistant division managers will be G. A. Blackburn and A. B. Oatman. Mr. Blackburn became a salesman for the company in 1936. Mr. Oatman came with the company in 1916 and has had an executive sales position since 1939.

J. A. Hammond, who has been with National Carbon Company since 1923 as salesman and sales executive, will manage the Pittsburgh Division. F. S. Haggerson and W. E. Herr have been named assistant managers. Mr. Haggerson has been with the company for the last nine years, for seven years of that time in a sales capacity. Mr. Herr has worked for the company both as a salesman and sales executive since 1922.

Heading the Chicago Division will be H. A. Stewart, who came with National Carbon in 1919. He has worked continuously in Chicago, first as a salesman in the former "Eveready" Division and later as a sales execu-



Isometric Cut-Away View of an
EICOR DYNAMOTOR

EICOR produces a Dynamotor for *every* need—from the smallest in size to the largest in output. Our complete line of frame sizes makes possible the greatest available range of dynamotor output ratings, sizes and weights.

WALL CHART AVAILABLE
18" x 24" reproduction of this isometric cutaway, complete with dynamotor data on outputs, sizes and weights available without charge to engineers and instructors. Write for it on company or official letterhead.

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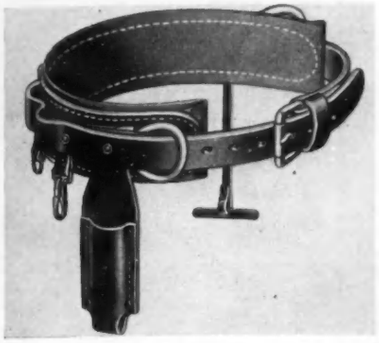
tive. Assistant division managers will be C. H. Christensen and W. L. Julian. Mr. Christensen began with National Carbon about 20 years ago, serving as a salesman and later as a sales executive in St. Louis and Pittsburgh. Mr. Julian began as a company salesman about 15 years ago. For the last seven years he has been calling on customers in the Chicago area.

Klein Announces New "Klein-Kord" Lineman's Belt



Mathias Klein & Sons, Chicago, Illinois, manufacturers of pliers, tools and equipment for the electrical field, announce a revolutionary tool belt made of specially developed material called Klein-Kord.

Klein-Kord is a newly developed material consisting of multi-ply, specially woven long staple cotton laid in rubber and vulcanized. According to this manufacurer, Klein-Kord is water-proof, has a tensile strength many times that demanded in actual service, and possesses absolute uniform quality, great strength, and flexibility.

In Klein-Kord, the cross cords are extra strength, which makes it possible to punch holes in the belt strap without danger of ripping under strain. This permits the use of a positive action, tongue-type buckle and does away with the necessity of using the dangerous friction-type buckle.

Belt construction: A two-inch wide body strap is riveted to the 4-inch wide belt forming four tool loops. A sturdy 4½-inch canvas lining, assures greater support and provides safety insulation by covering the rivets. Body moisture is also absorbed by the canvas lining thus increasing the comfort of the lineman. "D" rings of solid steel drop forgings are mounted in steel safety clips which are riveted through the main belt. The body strap in turn passes through the "D" ring to provide additional safety.

Other Klein-Kord products include climber straps and pads.

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. . . described fully in the folder illustrated above, will enable you to get delivery of the Utility Bodies needed for servicing the many miles of new power and communication lines that will be required for the thousands of new projects envisioned for the post-war period. The American Coach Replacement plan was worked out and set up after a thorough research and analysis of field conditions.

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Okay Sale of Mapleton Telephone Company

North Dakota's public service commission has granted the application of the Mapleton Mutual Telephone Company to sell and the Northwestern Bell Telephone Company of Fargo to buy farm line telephone property owned by the Mapleton company.

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We are anxious to help returning war veterans to secure positions in the Independent telephone field and will run position wanted ads free of charge in TELEPHONE ENGINEER. Pass the good word along.

Positions Wanted

POSITION WANTED: District plant superintendent or district wire chief. Have 16 years experience with central office equipment, outside plant maintenance and construction. Am 36 years old, married and a veteran of World War II. Desire to locate with company owning a group of exchanges. Experience has been on common battery, magneto, and automatic systems. Letters of reference upon request. Am unemployed and can start work with any company within the next 21 days. Write Box No. 8354, c/o TELEPHONE ENGINEER.

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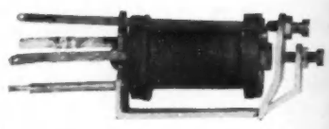

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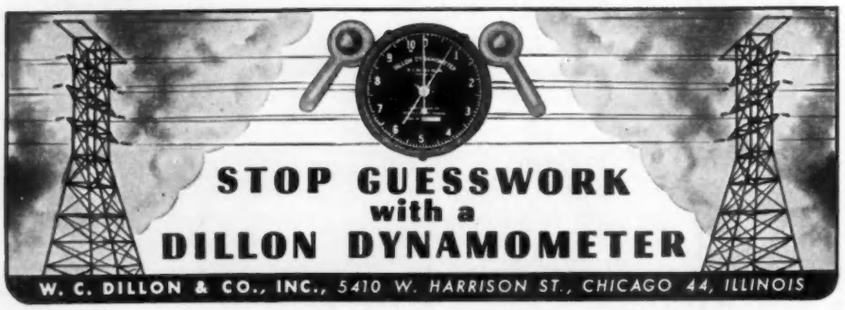
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